



A Review of the Studies on Learning Disabilities through Content Analysis

Una revisión de los estudios sobre las discapacidades en el aprendizaje a través del análisis de contenidos

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ABSTRACT

Learning disability is associated with inabilities in reading-writing, mathematical-arithmetic skills, speaking, listening and reasoning and its prevalence has increased strikingly among school-aged children especially in recent years. This study aims to determine the current situation and trends in learning disability research through content analysis. Content analysis was used as qualitative research method. Data of the study were obtained from Web of Science by using the keyword "learning disability". In order to analyze the obtained data, previously determined content analysis criteria were used. These criteria included year of publication, document type, organization, funding agencies, authors, name of the journal, country, language and research area of the researches. Data were analyzed and provided with frequency and percentages and shown with tables and figures. Results were presented in detail with reference to previous literature and recommendations for further research and practices are provided.

RESUMEN

La discapacidad en el aprendizaje está asociada con la incapacidad para hablar, escuchar, razonar, leer o escribir o con los problemas con las habilidades aritméticas y matemáticas; además, su prevalencia ha aumentado notablemente entre los niños en edad escolar, especialmente en los últimos años. Este estudio tiene como objetivo determinar la situación actual y las tendencias en la investigación sobre la discapacidad en el aprendizaje a través del análisis de contenidos. Se ha utilizado el análisis de contenido como método de investigación cualitativa. Los datos del estudio se obtuvieron de Web of Science utilizando las palabras clave "learning disability". Para analizar los datos obtenidos se utilizaron criterios de análisis de contenido previamente determinados. Estos criterios incluían el año de publicación, el tipo de documento, la organización, los organismos de financiación, los autores, el nombre de la revista, el país, el idioma y el área de investigación de las investigaciones. Los datos se analizaron y se proporcionaron con frecuencia y porcentajes y se mostraron con tablas y gráficos. Los resultados se presentan en detalle con referencia a la literatura anterior y se proporcionan recomendaciones para investigaciones y prácticas adicionales.

1. Introduction

Definition of learning disability is in a continuously changing cycle in the historical process as many other special education categories. One of the most important and recent innovation in the definition of learning disability appeared in diagnostic criteria described by Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) in 2013 (American Psychological Association, 2013; Melekoglu & Cakiroglu, 2017).

According to DSM-5, learning disability is defined as a neurodevelopmental disorder which has a biological basis and characterized with abnormalities in behavioral and cognitive functioning. This represents the last definition for children who experience difficulties in gaining various basic academic skills (Cornoldi, Giofre, Orsini & Pezzuti, 2014). The basic academic skills mentioned in DSM-5 are as follows:

- Reading words accurately and fluently.
- Comprehension.
- Written expression and writing.
- Arithmetic calculation.
- Mathematical reasoning.

Concept of learning disability has been affected by the developments in medicine, psychology and education. These disciplines tried to describe learning disability and its reasons based on their theories. Therefore, there are various definitions of learning disability in the literature. Combining these disciplines; neurological and cognitive factors and emphasis on academic skills are important dimensions of the definition of learning disability. In addition to the definition of learning disability in DSM-5, there are other symptoms and identifications related with learning disability. These involve significant difference in expected and performed achievement, difficulties in learning academic skills, inability in basic cognitive functioning, unequal growing patterns in learning fields, defect in central nervous system and not having intellectual disability, sensory impairment, physical disability or cultural inadequacy (Sridevi, George, Sriveni & Rangaswami, 2015). Since learning disability symptoms include difficulties in academic skills such as reading, writing and performing mathematical skills, learning disability is diagnosed during primary school period (Demirci & Demirci, 2016).

Learning disability is associated with inability in reading-writing, mathematical-arithmetic skills, speaking, listening and reasoning. Accordingly, classification of learning disability considers that there are three categories of learning disability. These categories include reading disability, writing disability and mathematical disability. Reading disability is named as dyslexia and characterized with blending letters and words and perceiving reversely. Children with dyslexia experience difficulties in reading and speaking. They come up from behind their peers in terms of reading (Eden, Olulade, Evans, Krafnick & Alkire, 2016; Balci, 2017). Writing disability is the second category of learning disability and named as dysgraphia. Children with dysgraphia writes slower than their peers and make mistakes in letter, syllable, punctuation and grammar and they have irregular style of writing. Mathematical disability is named as dyscalculia and associated with difficulties in doing arithmetic operations, solving problems and achieving other mathematical skills (Berninger & Wolf, 2016; Mutlu & Akgun, 2017).

Research on learning disability generally focus on dyslexia because of the higher prevalence of dyslexia compared to other categories of learning disability and it affects academic achievement more than other categories. Research also showed that learning disability is more prevalent in boys than girls. Although prevalence of learning disability show differences, it is known that children with learning disability constitute almost 50% of all special education categories. In addition, almost 4.5% of school-aged children are diagnosed with learning disability. After the first legal description of learning disability in 1975 in America, prevalence of learning disability has increased three times at the present (Cortiella & Horowitz, 2014; Diken, 2015).

Given the high and increasing prevalence of learning disability, special education research results and implications for learning disability becomes more important. Therefore, identifying the current situation and trends in research on learning disability and implications of these research would lead the way for researchers and professionals working in the special education field. Therefore, this study aims to determine the current situation and trends in learning disability research through content analysis. It is expected that this study would provide guidance for further research and practices regarding learning disability.

2. Method

2.1. Research Model

A total number of 2,369 published documents were examined based on the review of Web of Science. Results were interpreted based on the content analysis criteria and discussed with relevant research from the literature. In order to explain obtained data and reach required concepts and associations, content analysis method which is one of qualitative research methods was used in the study. Content analysis method is used to categorize,

compare and reach conceptual outcomes based on obtained data (Cohen, Manion & Morrison, 2007). In content analysis method, results and trends of the studies conducted in a specific field are evaluated based on descriptive and systematic manner (Karasar, 2005; Lin, Lin & Tsai, 2014). In this study, data were interpreted based on previously determined criteria and themes.

2.2. Data Collection

Web of Science was selected as the database for the study. Web of Science is one of the international and academic databases which indexes a large number of scientific journals worldwide (Bakkalbasi, Bauer, Glover & Wang, 2006). The published documents were obtained through searching keywords "learning disability" in order to reveal the current situation and trends in this area. The published documents were searched and identified by the researchers and a total number of 2.369 published documents were obtained for the study.

2.3. Data Analysis

In data analysis, content analysis criteria were determined to examine the published documents in Web of Science database. These criteria included year of publication, document type, organization, funding agencies, authors, name of the journal, country, language and research area of the researches.

3. Results

3.1. Distribution of the published documents based on the year of publication

In Table 1, frequency and percentage values of publication year of the articles on learning disability published in Web of Science database are provided. As it can be seen, the years in which the articles with high frequencies were published are distributed between 2008 and 2017. Results showed that the highest number of publications is in 2015 ($f=331$; 13.972%) and the lowest number of publications is in 2008 ($f=173$; 7.303%). According to the results, it can be inferred although there is not a steady increase in the number of publications in recent years, number of publications increased after 2008 and 2009.

Publication Year	f	%
2017	295	12.453
2016	293	12.368
2015	331	13.972
2014	234	9.878
2013	236	9.962
2012	203	8.569
2011	216	9.118
2010	200	8.442
2009	188	7.936
2008	173	7.303
Total	2.369	100

Table 1. Published documents based on the year of publication.

3.2. Distribution of the published documents based on the name of the type of documents

Document types of the analyzed documents are shown in Table 2. According to the results, majority of the published documents on flipped learning were articles ($f=1,828$, 77,163%). Results also showed that 165 of the published documents were reviews ($f=165$, 6.965%), 142 of them were meeting abstracts ($f=142$, 5.994%), 128

of them were proceeding papers ($f=128$, 5.403%) and 68 of them were editorial materials ($f=68$, 2.870%). This result implied that authors mostly prefer to publish research articles and reviews.

Document Type	f	%
Article	1.828	77.163
Review	165	6.965
Meeting Abstract	142	5.994
Proceedings Paper	128	5.403
Editorial Material	68	2.870
Letter	22	0.929
Book Review	20	0.844
Book Chapter	6	0.253
Correction	3	0.127
News Item	3	0.127
Total	2.369	100

Table 2. Document types of the published documents.

3.3. Distribution of the published documents based on the organization

Organizations of the analyzed documents is shown in Table 3. The first 10 organizations with higher frequencies are included in the table. According to the results, majority of the published documents on learning disability were mostly affiliated to University of London ($f=125$, 5.276%), University College London ($f=64$, 2.702%) and Kings College London ($f=49$, 2.702%).

Organization	f	%
University of London	125	5.276%
University College London	64	2.702%
Kings College London	49	2.068%
University of California System	49	2.068%
University of Edinburgh	44	1.857%
University of Cambridge	43	1.815%
University of Manchester	40	1.688%
Harvard University	36	1.520%
University of Texas System	36	1.520%
University of Oxford	33	1.393%

Table 3. Organization of the published documents.

3.4. Distribution of the published documents based on funding agencies

Table 4 shows the distribution of published documents based on funding agencies is provided with frequency and percentage values. The first 10 frequent funding agencies are included in the table. Results revealed that NICHD NIH HHS ($f=52$, 2.195%) WELLCOME TRUST ($f=25$, 1.055%) and NATIONAL INSTITUTES OF HEALTH ($f=21$, 0.226%) are the most frequent funding agencies which contributed to the research carried out in learning disability.

Funding agencies	f	%
NICHD NIH HHS	52	2.195%
WELLCOME TRUST	25	1.055%
NATIONAL INSTITUTES OF HEALTH	21	0.886%
NIH	16	0.675%
MEDICAL RESEARCH COUNCIL	14	0.591%
NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT	14	0.591%
ECONOMIC AND SOCIAL RESEARCH COUNCIL	13	0.549%
EUNICE KENNEDY SHRIVER NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT	12	0.507%
DEPARTMENT OF HEALTH	11	0.464%
NATIONAL INSTITUTE FOR HEALTH RESEARCH	10	0.422%

Table 4. Funding agencies of the published documents.

3.5. Distribution of the published documents based on authors

Distribution of the published documents based on authors is shown in Table 5. The first 10 authors with higher publications in the area of learning disability indexed in Web of Science are involved in the table. As it can be seen, Geary Dc., Mckenzie K., Karande S., Mazzocco Mmm., Semrud-Clikeman M., Mammarella Ic., Cornoldi C., Brown M., Gillberg C. and Redley M. are the names of these authors with frequent publications in the area of learning disability.

Authors	f	%
Geary Dc.	20	0.844%
Mckenzie K.	17	0.718%
Karande S.	15	0.633%
Mazzocco Mmm.	15	0.633%
Semrud-Clikeman M.	14	0.591%
Mammarella Ic.	13	0.549%
Cornoldi C.	12	0.507%
Brown M.	10	0.422%
Gillberg C.	10	0.422%
Redley M.	10	0.422%

Table 5. Authors of the published documents.

3.6. Distribution of the published documents based on name of the journals

Distribution of the published documents based on name of the journals is given in Table 6. The first 10 journals with higher number of publications among journals from the area of learning disability indexed in Web of Science are involved in the table. Results showed that *British Journal of Learning Disabilities*, *Journal of Intellectual Disability Research*, *Research in Developmental Disabilities*, *British Journal of Occupational Therapy*, *Journal of Learning Disabilities*, *Tizard Learning Disability Review*, *Journal of Applied Research in Intellectual Disabilities*, *Learning Disability Quarterly*, *American Journal of Medical Genetics Part A* and *Disability Society* are the first 10 journals with higher number of publications in learning disability area. As it can be seen, most of the journals have "Learning Disability" concept in their titles.

Names of the journals	f	%
British Journal of Learning Disabilities	143	6.036%
Journal of Intellectual Disability Research	80	3.377%
Research in Developmental Disabilities	68	2.870%
British Journal of Occupational Therapy	62	2.617%
Journal of Learning Disabilities	51	2.153%
Tizard Learning Disability Review	48	2.026%
Journal of Applied Research in Intellectual Disabilities	46	1.942%
Learning Disability Quarterly	34	1.435%
American Journal of Medical Genetics Part A	33	1.393%
Disability Society	29	1.224%

Table 6. Names of the journals of the published documents.

3.7. Distribution of the published documents based on countries

Distribution of the published documents based on countries is shown in Figure 1. The first 10 countries in which the researchers examined in the current study were carried out are involved in the figure. According to the results, England and USA are the first two countries with higher percentages in which the researches on learning disability were carried out. These results are followed with eight countries with lower percentages including Scotland, Canada, Australia, Italy, Germany, India, Netherlands and Sweden.

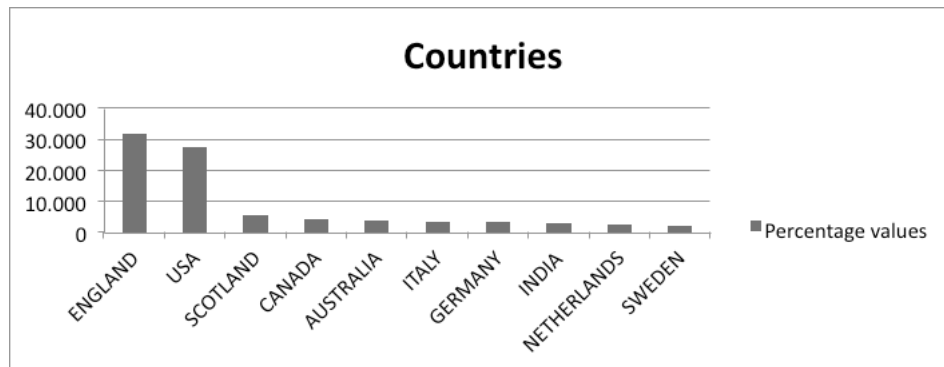


Figure 1. Countries of the published documents.

3.8. Distribution of the published documents based on language

Table 7 shows the distribution of the published documents based on language. All of the languages of the published documents are included in the table. As it can be seen, English is the most frequently used publication language in the published documents with the highest frequency ($f=2.317$, 97.805%). The remained languages have strikingly lower frequencies when compared to English. These languages included German, Spanish, French, Czech, Italian, Turkish, Chinese, Korean, Polish, Portuguese and Serbian.

Language	f	%
English	2.317	97.805%
German	20	0.844%
Spanish	10	0.422%
French	6	0.253%
Czech	4	0.169%

Language	f	%
Italian	3	0.127%
Turkish	3	0.127%
Chinese	2	0.084%
Korean	1	0.042%
Polish	1	0.042%
Portuguese	1	0.042%
Serbian	1	0.042%
Total	2.369	100

Table 7. Language of the published documents.

3.9. Distribution of the published documents based on research areas

Distribution of the published documents based on research areas is provided in Figure 2. All research areas of the published documents are involved in the figure. Results showed that Special Education and Rehabilitation were the most two frequent research areas studied in the area of learning disability with seemingly higher frequencies. Other remained research areas included Clinical Neurology, Psychiatry, Genetics Heredity, Pediatrics, Educational Psychology, Neurosciences, Educational Research and Developmental Psychology.

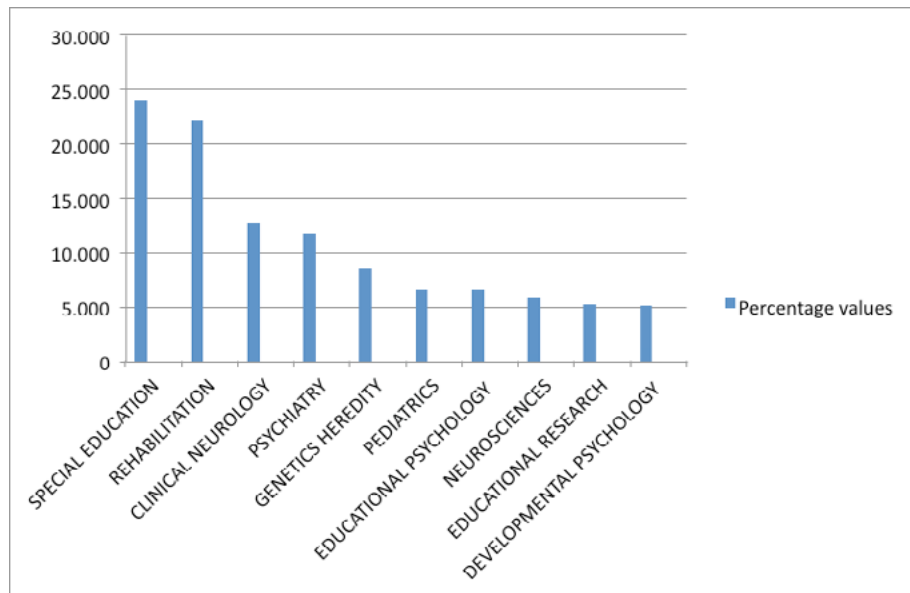


Figure 2. Research areas of the published documents.

4. Discussion

Learning disability as a special education category has become more prevalent in the recent years and therefore implications from research on learning disability come into prominent. For this reason, a systematic review of the scientific research conducted in a specific area is of great importance and the present study aimed to determine the current situation and trends in learning disability research through content analysis. Results of the study revealed that although there is not a steady increase in the number of publications related with learning disability in recent years, number of publications increased after 2009. This result might be related with the increasing number of learning disability cases (McKenna, Shin & Ciullo, 2015). Because of this, special education practices regarding learning disability have become more crucial and special education professionals need more scientific research and implications in order to provide more evidence-based and effective applications for children with learning disability. Therefore, the number of researches on this area might have increased.

According to the results, authors mostly prefer to publish research articles and reviews in the area of learning disability. Therefore, it could be inferred that authors studying in the area of learning disability carry out descriptive and experimental research in order to provide evidence-based results for special education practices and reviews for identifying current situation and trends in this area as aimed in the present study. Furthermore, results revealed that most of the published documents on learning disability were affiliated to University of London, University College London and Kings College London. Based on this result, it might be said that organizations of the published documents were mostly from England. Results on funding agencies of published documents showed that NICHD NIH HHS, WELLCOME TRUST and NATIONAL INSTITUTES OF HEALTH are the most frequent funding agencies which contributed to the research carried out in learning disability. Results also indicated that Geary Dc., Mckenzie K., Karande S., Mazzocco Mmm., Semrud-Clikeman M., Mammarella Ic., Cornoldi C., Brown M., Gillberg C. and Redley M. are the names of authors with frequent publications in the area of learning disability. It might be inferred that the variability in the authors could be related with the multi-dimensional nature of learning disability with three different categories including dyslexia, dysgraphia and dyscalculia (Dohla & Heim, 2016).

Furthermore, the highest number of publications on learning disability were in *British Journal of Learning Disabilities*, *Journal of Intellectual Disability Research* and *Research in Developmental Disabilities*. According to the results, England and USA are the first two countries with higher percentages in which the researches on learning disability were carried out. These results are followed with eight countries with lower percentages including Scotland, Canada, Australia, Italy, Germany, India, Netherlands and Sweden. Similarly, Aslan (2016) stated that large number of researches was conducted in USA in the recent years.

Results showed that English is the most frequently used publication language in the published documents with the highest frequency. DiCerbo, Anstrom, Baker and Rivera (2014) emphasized that English as an academic language is mostly preferred universally and worldwide. Nevertheless, results revealed that special education and rehabilitation were the most two frequently studied research areas in the area of learning disability with seemingly higher frequencies. Other remained research areas included clinical neurology, psychiatry, genetics heredity, pediatrics, educational psychology, neurosciences, educational research and developmental psychology. These results might be related with the inter-disciplinary nature of the concept of learning disability. Disciplines of neurosciences have important implications for learning disability because it is known that learning disability is associated with some abnormalities in brain structure (Raschle, Becker, Smith, Fehlbauer, Wang & Gaab, 2015). Psychology, education and related disciplines are also important research areas in learning disability because it is also known that learning disability is characterized with abnormalities in cognitive functioning and inabilities in gaining academic skills (Hen & Goroshit, 2014; Grünke & Morrison Cavendish, 2016; Torgesen, 1999).

5. Conclusion and Recommendations

The aim of this study was to carry out a content analysis study in order to provide comprehensive review on the studies related with learning disability published in Web of Science database. It is expected that this study would be a guidance for further research and practices for learning disability since it revealed the trends in the studies. Based on the results of the present study, the following recommendations for further research and practices are presented:

- Other international academic databases might be examined to collect data and identify the trends in published documents on learning disability research.
- Other content analysis criteria including research sample, topic, method and number of authors might be used to point out these tendencies in the published documents related with learning disability.
- Instead of revealing the current situation, further research might carry out studies with different research methods in order to provide comparative results.
- Guidelines for how to organize appropriate teaching environments and programs for individuals with learning disability might be emphasized more in scientific research for researchers and professionals working with children with learning disabilities.

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