A Comparative Review of the Inclusive Education across Canada, the United States and Turkey

Proposing a novel content validity technique for STEM and educational sciences

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Abstract

Inclusivity in education is an important field of consideration international, national and state/province level (Hardy & Woodcock, 2015). This study investigates the diversity, equity, and inclusive education documents with a perspective of STEM learning from three countries as Canada, the United States and Turkey. Curriculum and policy documents across these countries were reviewed and analyzed to make comparisons on the inclusive education approaches of Canada, the United States and Turkey. Review analysis was conducted as the way of a content analysis method. Results indicated that Turkey and Canada display the highest similarity based on the polycorric correlation computations (poly. r. = .57) , following the similarity between Canada and the United States (poly.r. = .55) , and the least similar counties were the United States and Turkey (poly.r. = .52). However, the differences between three countries were statistically small due to the moderate level effects sizes shared for each pairwise comparison, indicating: Canada, the United States and Turkey only slightly differ in STEM curriculum inclusion and statistical similarity amongst them is attaining with the consideration of the numerically resembling polycorric correlation and effect size values. This study also introduces an alternative content validity technique to the educational literature.

Introduction and Policy Review

The purpose of this research is to investigate the educational policy and curriculum documents with a STEM (Science Technology Engineering Mathematics) learning perspective across Canada, the United States and Turkey. Common and different characteristics of these three countries in terms of educational inclusion was investigated via using a review analysis technique based on the

policy documents, published scientific journal articles, and curriculum documents with an exploratory investigation of selected literature. To make such comparison, the total of 7 documents were analyzed. These documents are described in detail as the literature baseline of the present study and as the policy review section prior to the statistical analyses.

The significance of this research mainly relies on the Canada's inclusive education strategy documents as the fundamental basis of the literature impact of the review analysis. It is indicated in the Canada's educational policy documents that physical existence of students or their physical access to educational resources is not necessarily meaning educational inclusion. Instead, inclusive education is described as the providing all the necessary opportunities to *"all students"* and to especially students who are *"behind the state standards"* or having educational obstacles and educational barriers for learning (Whitley & Hollweck, 2020). Physical barriers, disabilities, and other means of difficulties such as sociological, language, sexual identity, cultural and religious differences, health, and emotional wellbeing issues are mentioned in their article as the controversial areas representing challenges of the inclusivity in education, in addition to school related factors, academic complexities and cognitive/learning barriers which are more widely discussed in the existing literature.

In addition to Whitley and Hollweck's current policy reform document from the province of Nova Scotia, the Ontario's Equity and Inclusive Education Strategy (2009) was also analyzed as an example to highlight inclusive education documents from Canada, which also states the importance of educational inclusion for the purpose of 1) delivering high-quality education to all and individual learners, 2) to reduce the achievement gap of students, 3) enabling to promote a cohesive society and strong economy (Ontario Ministry of Education, 2009).

With the similar conceptual framework to the educational inclusion, there are historically representative documents from the earlier decades in the United States and the No Child Left Behind Act of 2001 (NCLB) is one of the most important legislative policy documents which has been introduced to the educational policy literature earlier than the concept of educational inclusion, diversity, and equity. Authors believe that the NCLB act is the fundamental basis for most of the present inclusive education policy, reform, standard and curriculum documents which have been included in this present research from either in Canada and Turkey. For that reason, we would like to address the *NCLB as the leading policy and the fundamental basis* for *the educational*

inclusion structure of today's educational research. As one of the summarizing documents of that provision, A Guide to Education and No Child Left Behind (U.S. Department of Education, 2004) was included as the representative example of the inclusive education from the country of the United States in this current research.

For the purpose of reviewing the STEM curriculum and involve the science education inclusion perspective in this research, the Next Generation Science Standards (NGCS, 2013) is also considered as a substantial fragment with STEM learning focus. Specifically, Appendix D- "All Standards, All Students" of the NGSS was included in this review study as part of the educational inclusion in science learning and has been reviewed with the inclusive education perspective as a curriculum and learning standard document.

Two policy documents on the concept of educational inclusion were also examined in this research to provide comprehension of the educational policies on the inclusive education in Turkey. These documents were in Turkish and the retrieved educational inclusion keywords were translated into English by the researchers of this study. The first document is "Inclusive Education Statement Analysis in Secondary Education in Turkey" which is published by the Education Reform Activity (ERA, 2016). This document summarizes diversity, equity, and inclusion topics such as international perspectives, gender and society, disability, religion, culture, and economical situations within the scope of educational inclusion.

The second document is the "Policy Suggestions to Distribute Inclusive Education in Turkey" (ERA, 2016) by the same educational reform platform. This reform document covers the current status of the inclusive education in Turkey with the highlight of the UNESCO and children rights, the definition of inclusivity in educational system, and policy suggestions to distribute inclusive education in Turkey, for example, informatory trainings on inclusive education, educational programs, curriculums and course materials, school related and in-service training for teachers to increase their knowledge on the concept of inclusive education.

Moreover, Aydagul's (2008) research article for the "Education for All" analyzing the policies to promote equity in Turkey is included in this present study. This written document is produced in English, that's why the keywords were included in the review analysis without being translated.

To sum up, selected examples from the educational and policy documents, curriculum, and standards documents, as well as reform documents written by either researchers and policy organizations across Canada, the United States and Turkey were reviewed and analyzed to make a comparative study to conclude about the commonalities and apartness of these country's educational systems on the inclusive education framework.

Based on the introduction and policy review of this study, the research question (RQ) is designated as below.

RQ: What is the similarity and apartness of Canada, the United States and Turkey in terms of educational inclusion policies and curriculum standards?

Examples from the Literature

An analysis of inclusive education policies across the United States, Canada, England and Australia was conducted by Hardy and Woodcock (2015). They investigated the key policies from UNESCO and Organization for Economic Co-operation and Development and provided inclusive education practices based on diversity and neoliberalism perspectives. Their research draws attention to and supports diverse needs and abilities of people in the society and enrolled in the educational system. They referred to Taylor's (1997, as cited in Hardy and Woodcock, 2015) suggestions on inclusive education and summarize that at any given timeline symbolic policies might have broader and more abstract goals with insufficient implementation plans; while on the other hand, material policies provide more extensive resource support and a reliable commitment to educational applications.

Melissa Chin (2020) provided an in=depth analysis of inclusive education with the case in Malaysia. She described the Zero Reject policy in different levels and explained how the inclusive education approach is interpreted by this specific policy in that research. Also, importance of inclusivity of all disabled students in stages and rights of educational procedures.

Sandoval and Messiou (2020) have studied the areas related to school improvement with inclusive education strategies. They focused on students as researchers and co-researchers for educational improvement. They stated that school change and inclusive education in both primary and secondary schools after analyzing 28 scientific journal articles on this context. They provided significant references to the articles addressing on anti-inclusion topics such as; bullying,

difficulties of adaptation to year 1, difficulty of bilinguality, and, school culture (Vallejos, 2018; Kellet, 2009-2011; Kehoe, 2015; Mearns, Coyle & de Graaf. 2014).

Furman (2019) underlined educational inclusion with the concept of curriculum studies. She defined curriculum as conversation to be achieved for all students and its benefits to everyone in the field of education. Moreover, she described how teachers treated curricula as an inclusive conversation to include their students in the Brooklyn Teacher Research Seminar (BTRS) in 2004 and 2009.

Data Structure and Analysis

To answer the above mentioned RQ, the authors retrieved keywords from the existing policy and curriculum documents. The data structure of the analysis is constructed as a data matrix composed of 508 rows and 3 columns. Rows were including the specific keyword across all policy documents and each column represent three countries which were compared in terms of educational inclusion.

In other words, the data structure of the research is represented as:

$$data\ matrix$$

$$r\ x\ c = 508\ x\ 3$$

r = 508 keywords included in review analysis; c = 3 columns combined by a total of 7 pdf policy documents.

These keywords were derived from the pdf texts from the total 7 documents, 2 from Canada, 2 from the United States and 3 from Turkey. Existence of the keyword was represented as "1" and non-existence of the keyword was defined by "0" to construct a dichotomous (or binary) data structure. This data was initially created in excel then transformed into R programming software for polycorric correlation and effect size calculations. Since there is more than one document representing each country, the data was rearranged as ordinal data. For instance, Canada has two pdf policy documents, the existence of a specific keyword is coded as 1 for each source, and the data matrix was constructed as:

a- if the keyword exists in *two* of the documents the resulting cell value is 2,
b- if the keyword exists in *one* of the documents but did not appear (relevantly) in the other document the cell value is coded as 1,
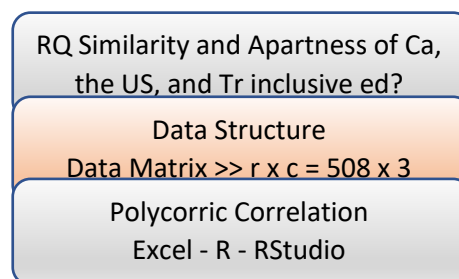
c- if the keyword appears ***neither*** of the documents the coding value is 0.

This arrangement resulted in ordinal data rated as 0-1-2. Turkey has three columns for each document source and its data matrix have 0-1-2-3 value similarly to the explanation above. Also, if a keyword repeated in more than one document with "synonyms" or "translated words" that also yielded an extra count, resulting in 0-1-2-3-4 coding in the data matrix. However, the polycorric correlation values were computed for all 0-1-2- and 0-1-2-3-4 data structures and the first coding cells yielded the higher correlational values (although being not too different) than the more complex dataset. For both consistency consideration and the higher similarity value encouraged the researchers to use the 0-1-2 ordinal coding for the final data analysis before data was transferred into R computer program.

Correlational computations were conducted for each pair of countries as a comparison of similarity analysis both in R and excel. Simple correlation was calculated in excel as a preliminary analysis, and polycorric correlation was computed in R programming language and R Studio interface. Canada and United States, Canada and Turkey, and the United States and Turkey were three main pair-wise comparisons in terms of inclusive education keywords.

The below figure also displays the research question, data structure and analysis of the present review analysis research.

Figure 1. Outline of the Research

RQ Similarity and Apartness of Ca, the US, and Tr inclusive ed?

Data Structure
Data Matrix >> r x c = 508 x 3

Polycorric Correlation
Excel - R - RStudio

As seen from the above figure and the data analysis steps explained in this section, a review analysis was conducted as a way of content analysis for inclusive education definition and meaning across three countries.

In the appendix, the data format is being provided to the readers to enhance the understanding of the keyword analysis logic and the formation of the keyword data sets.

Quantitative Findings

Results of polycorric correlation indicates that the Canada and Turkey have the major similarity rather than any apartness in terms of reviewed curriculum and policy pdf materials. Inclusive education documents indicate a high similarity between these two countries (*poly. r.= .57, effect size = .5763*). That similarity findings are followed by the pair-wise comparison of Canada and the United States (*poly. r.= .55, effect size = .6184*), and the comparison of Turkey and the United States also provided a slightly smaller correlation finding (*poly. r.= .52, effect size = .6475*). However, all these comparisons are falling into the very similar range of effect size values ranging from .58 to .65 which indicates the moderate to high level of effect size value with close correlation calculations around .50s. That might be inferred from these calculations that the three countries have more commonalities and similarities rather than distinct differences, but they still include slight apartness based on this review analysis method.

Limitations of the Study

One limitation of the study might be mentioned as the different structure of the selected documents for the United States, when compared to the close relevancy for the type of documents from Canada and Turkey. That would be claimed as an essential reason (although should not be claimed as the sole and only reason) of the highest correlational value between Canada and Turkey. Even though the policy documents from Turkey was in Turkish and translated into English, this translation could not affect the similarity of the inclusive education documents. That was possibly because of the relevancy of the documents from Canada and Turkey for being inclusive education policy documents and written journal manuscripts by the researchers. On the other hand, the United States documents were selected among the earlier existing legislative and standard policy documents instead of being identical inclusive education documents.

Future Study, Discussion, and the Link to Validity

This study would serve as a promising and easy-to-apply quantitative research example in the field of content analysis and/or validation studies. The review analysis method composed of the keyword identification as the content analysis, combined with the correlation calculations as the statistical technique, would introduce a novel and less complicated quantitative method for educational researchers. Both conceptual approach and the statistical analysis would be

appropriate to apply in various fields of education. For example, this research displays an example for "inclusive education" focusing with STEM learning curriculum standard perspective, yet, other educational content matter experts would be able to use this method to understand the *"meaning, structure, definitions"* of the construct (widely referred as the latent factor and dimension in the existing validity literature) established on the Kane's (2010) definition of the validity as the *"test score use, meaning and interpretation"* and Messick's (1989) *"appropriateness of inferences on testing and other modes of assessment"* identification.

All validity types are defined as a form of construct validity in the Standards for Educational and Psychological Testing (AERA, APA, NCME; 2014) including content validity as well. Although the present study does not rely on the item-level test data (or test score) obtained by students and test-takers, a content analysis was conducted on the latent construct, latent dimension of "inclusive education" structured on the data matrix created by the keywords used in the policy documents as an *"alternative technique to give meaning to inclusive education"*. Within this perspective, authors would confidently claim that this research constitutes an example and guideline for "*a new content analysis approach*" in the field of educational sciences, even if not directly declared as a succinite content/construct validation method. With the appropriate and well-defined use of the review analysis technique described in this written document, the researchers would implement this quantitative approach to define the educational constructs which are not directly observed through the student assessment data or the conceptual dimensions in existing scientific literature.

Ending notice: Practical Applications

Furman (2014; 2019) provided practical applications of inclusive education with BTRS papers. He mentioned these applications as following:

- converse with previous curriculum
- allow teachers to be drawn into
- attend and care
- make space for everyone
- define solutions
- invite children to larger conversations (Furman, 2014).

These practical suggestions, as the authors believe, would be applicable to almost every cases of the educational inclusive aspects in classroom, schools, and nations.

Appendix

A1. Review Analysis Keywords for Inclusive Education (Sample visual from dataset)

English keywords	Ca Whitley_2	Ca Equity.pdf	Canada to Canada to	US guide-2.p	US Appendix	US USA total	Tr 1st tran Turkish ke	Tr ERG_Kaps	Tr ERG_Kaps	Tr 2nd tra Turkish ke	Tr ERG_Kaps	Tr ERG_Kaps	Tr Turkey total
same age	1	0	1	0	0	0	akran	1	1	ayni yasta	0	0	2
policy	1	1	2	1	1	2	politika	1	1	xxxx	0	0	2
reform	1	1	2	1	0	1	reform	1	1	yenilik	0	1	3
equity	1	1	2	0	1	1	esitlik	1	0	xxxx	0	0	1
needs	1	1	2	1	1	2	ihtiyaclar	0	1	xxxx	0	0	1
special ed	1	1	2	1	1	2	ozel egitir	1	1	xxxx	0	0	2
marginali:	1	0	1	0	1	1	marjinalle	0	0	xxxx	0	0	0
roles	1	0	1	0	1	1	roller	1	1	xxxx	0	0	2
identities	1	0	1	0	1	1	kimlikler	1	0	xxxx	0	0	1
support	1	1	2	1	1	2	destek	1	1	xxxx	0	0	2
effective	1	1	2	0	1	1	etkili	1	1	xxxx	0	0	2
universal	1	0	1	1	1	2	evrensel	1	1	xxxx	0	0	2
differenti	1	1	2	0	1	1	farklilasm	0	0	xxxx	0	0	0
professioi	1	1	2	1	1	2	profesyon	0	1	xxxx	0	0	1
internatio	1	1	2	0	1	1	uluslar ar:	0	0	xxxx	0	0	0

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