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Bibliometric Analysis of Peer-Reviewed Scholarly Research on Adult Online Learning Motivation(2000–2022)
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Abstract:	Abstract Adult learning theories have long been criticized for its lack of (or inconsistent) empirical evidence, while the existing research body on adult online learning motivation primarily addresses specific field-based issues that has proved difficult to be widely applicable. Thus, we conducted a bibliometric analysis to review and evaluate the global scientific output of research on adult online learning motivation and explore the patterns and/or trends in this field from 2000 to 2022. The R bibliometric package and its associated biblioshiny app was used for both quantitative and qualitative analyses of the compiled bibliometric data. In total, 541 relevant articles and reviews were included in the analysis. Performance analysis results show (1) substantial increase in related publications over the time (from 2 papers in 2000 to 77 papers in 2021), (2) Computers & Education was the most active journal, and (3) the biggest contributing country and institution were USA and Vrije Universiteit Brussel respectively. Scientific mapping, text mining, and network analysis indicated that COVID-19 had significantly impacted the research field in terms of (1) trendy topics (e.g., transformative learning, COVID-19 impacts, self-directed learning, & gamification), (2) centralized themes (e.g., teaching/learning strategies, self-regulated/directed learning, computer-supported collaborative learning, social media/communities of practice, dropout/retention, creativity/critical thinking, & challenges/barriers), and (3) research collaboration networks (e.g., the top three collaborating country partnerships were USA & Canada, USA & China, and China & Australia). Our bibliometric analysis pointed out the overall direction of research on adult online learning motivation towards (1) facilitation of SRL and transformative learning, and (2) creative use of technological advancements (e.g., gamification & virtual online learning communities).
Suggested Reviewers:	Amirrudin Kamsin University of Malaya amir@um.edu.my Dr. Kamsin co-authored "Challenges in the Online Component of Blended Learning: A Systematic Review". This systematic review article was published in 2020 on Computers and Education, and has ever since received 203 total citations and the highest number of citations per year (67.67). This shows the remarkable impact of Dr. Kamsin's research and his expertise in online teaching and learning.

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Dr. Ng published an influential systematic review of 40 years of motivation research, titled "Shifting the focus from motivated learners to motivating distributed environments: A review of 40 years of published motivation research" (2019). He is also currently Research Director of "Learning and Learners" research concentration at the Institute for Learning Sciences and Teacher Education (ILSTE), Australian Catholic University.

Bibliometric Analysis of Peer-Reviewed Scholarly Research on Adult Online Learning Motivation

(2000–2022)

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Abstract

Adult learning theories have long been criticized for its lack of (or inconsistent) empirical evidence, while the existing research body on adult online learning motivation primarily addresses specific field-based issues that has proved difficult to be widely applicable. Thus, we conducted a bibliometric analysis to review and evaluate the global scientific output of research on adult online learning motivation and explore the patterns and/or trends in this field from 2000 to 2022. The R *bibliometric* package and its associated *biblioshiny* app was used for both quantitative and qualitative analyses of the compiled bibliometric data. In total, 541 relevant articles and reviews were included in the analysis. Performance analysis results show (1) substantial increase in related publications over the time (from 2 papers in 2000 to 77 papers in 2021), (2) *Computers & Education* was the most active journal, and (3) the biggest contributing country and institution were USA and Vrije Universiteit Brussel respectively. Scientific mapping, text mining, and network analysis indicated that COVID-19 had significantly impacted the research field in terms of (1) trendy topics (e.g., transformative learning, COVID-19 impacts, self-directed learning, & gamification), (2) centralized themes (e.g., teaching/learning strategies, self-regulated/directed learning, computer-supported collaborative learning, social media/communities of practice, dropout/retention, creativity/critical thinking, & challenges/barriers), and (3) research collaboration networks (e.g., the top three collaborating country partnerships were USA & Canada, USA & China, and China & Australia). Our bibliometric analysis pointed out the overall direction of research on adult online learning motivation towards (1) facilitation of SRL and transformative learning, and (2) creative use of technological advancements (e.g., gamification & virtual online learning communities).

Keywords: bibliometric analysis, motivation, adult online learning

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Introduction

Motivational research has a long-standing historical tradition developing from the early focus on an individual's instincts in response to environmental concerns (Freud, 1957), transitioning to human cognitive processes behind motivation reflecting intellectual capacity and curiosities (Fenichel, 1945; Herzberg, 1966; Piaget, 1952; White, 1959), and now seeing flourishing new research in observational studies of human interactions highlighting the significant societal, historical, and/or cultural contexts underlying motivational processes (Bannier, 2010; Sarsar, 2012).

Historically, the two most influential educational motivation theories are: Deci and Ryan's (1985) Self-Determination Theory (SDT) and Bandura and Schunk's (1981) Achievement Goal Theory (AGT). While SDT sets up a theoretical framework for educational motivation research along the continuum of self-determination: *intrinsic*, *extrinsic*, and *amotivation*; AGT focuses on attitude towards learning as the critical determinant of learner motivation, with concepts such as goal-mastery or the joy of learning serving as critical motivators for some learners (Hegarty, 2011).

However, the research body on adult online learning motivation is comparatively less grounded in its own comprehensive, solid theoretical framework. It thus appears more fragmented/disconnected by addressing primarily field-based issues specific to certain target learner groups, online programs, classes/courses, pedagogical approaches, or adoption of detailed instructional design, modalities, and/or technologies (Abedini, Abedin, & Zowghi, 2021; Hashim, Tan, & Rashid, 2015).

For instance, the practice and research of adult education in general (and adult online education is no exception) have been heavily influenced by Knowles' (1980) andragogical assumptions that in contrast to child learning, adult online learning should be cooperative, student-centered, and flexible, emphasizing shared responsibilities in planning, goal setting, and evaluation while encouraging and

supporting SDL. Unfortunately, these andragogical assumptions have long been criticized due to a lack of empirical evidence, including inconsistent/conflicted empirical findings (Atherton, 2003; Bellager & Van Slyke, 1988; Brookfield, 1995; Hartree, 1984).

Noting the apparent theory-practice mismatch in research literature on adult online learning motivation, Pintrich (2003) proposes that motivational research should be conducted systematically as a motivational science in that the study of learner motivation should be approached with the rigor that various theoretical perspective brings, and findings should be tested empirically to reinforce/adjust/improve the overall theoretical framework. However, this grand mission cannot be achieved without a comprehensive, in-depth understanding of the existing scholarly landscape in adult online learning motivational research, especially during the past two decades when our world in and beyond the field of education has seen numerous, unprecedented changes in technological, economic, political, social, and cultural aspects.

A preliminary literature search (using various databases and search engines such as Web of Science and Google Scholar) revealed that despite a sharp increase of bibliometric publications on online education after the COVID-19 outbreak in 2019, no bibliometric studies had ever been conducted exclusively on motivational research in adult online learning. Therefore, the current study aims to establish the baseline data on this topic for future research and references for scholars, practitioners, and policymakers in adult online education.

1.1 Overview of the existing systematic reviews

This section presented an overview of the existing research reviews of theoretical and empirical literature on adult online learning motivation. These review articles spanned over 60 years and attained data from a total of 374 sources. Table 1 below lists the seven meta-analyses and systematic reviews published in peer-reviewed journals so far on this topic.

Table 1.

An Overview of the Existing Systematic Reviews of Motivational Research in Adult Online Learning

Title	Year Span (Total Publications Reviewed)	First Author (PY[2])	URL/DOI
Motivating and assisting adult, online chemistry students: A review of the literature	1977-2009 (54)	Bannier (2010)	10.1007/s10956-009-9195-x
Effects of gamification on behavioral change in education: A meta-analysis	2010- 2019 (62)	Kim et al. (2021)	https://doi.org/10.3390/ Ijerph18073550
Shifting the focus from motivated learners to motivating distributed environments: A review of 40 years of published motivation research	1983-2019 (74)	Ng (2019)	https://dio.org/10.1080/01587919.2019.1681892
Motivation and online adult learners: How do we do that?	1980-2012 (28)	Sarsar (2012)	https://www.semanticscholar.org
A grounded meta-analysis of adult learner motivation in online learning from the perspective of the learner	1995-2005 (14)	Styer (2007)	https://www.learntechlib.org/p/118078/
Adult learning in online communities of practice: A systematic review	2012-2020 (37)	Abedini et al. (2021)	DOI: 10.1111/bjet.13120
Psychological interventions of virtual gamification within academic intrinsic motivation: A systematic review	1990-2020 (105)	Xu et al. (2021)	https://doi.org/10.1016/j.jad.2021.06.070

A synthetic examination of these research reviews revealed that the field of adult online learning motivation had changed significantly, reflecting various impactful internal and external developmental trends in technologies, online educational theories and practices, and societal and cultural changes. Overall, the focus of research has shifted from measuring learners' intrinsic motivations to investigating more complex, intertwined factors contributing to multiple facets of adult

motivation in online learning. Specifically, it was noted that despite abundant research conducted on

the topic, most of the literature was still limited to studying one dimension (e.g., learner perspective,

instructor roles, program designs, and educational technologies, etc.) at a time, instead of a more

expansive inquiry capturing the complex and fluid nature of adult online learning motivation.

1.2 Purpose of the present study

To bridge the vital gap between outdated theoretical foundations and flourishing empirical

research in the field, a bibliometric analysis was conducted in the current study to systematically review

and evaluate the relevant scholarly publications on adult online learning motivation during the 2000-

2022 period. Thus, the following research questions were addressed to identify trends and core drivers

of the published work on this topic:

Research Questions Based on Performance Analysis

RQ1: How did research on adult online learning motivation evolve intellectually between 2000

and 2022, measured by publications and citations?

RQ2: Who are the prominent journals, institutions, nations, and authors in this research field

worldwide?

RQ3: Which papers have the greatest impact/influence?

Research Questions Based on Network Analysis

RQ4: What are the research collaboration and authorship patterns?

Research Questions Based on Scientific Mapping

RQ5: What are the trendy topics in this research field most recently?

RQ6: How have the central research themes evolved periodically over the 2000-2022 timespan?

Material and methods

2.1 Data sources

The bibliometric data used in this study were retrieved from the Web of Science (WOS) Core Collection on November 18th, 2022, via the corresponding author's institutional access. First, a search query was developed for the following components: (1) motivat* adult learn* (Topic), (2) support* adult learn* (Topic), (3) engag* adult learn* (Topic), (4) facilitat* adult learn* (Topic), (5) adult learn* outcome (Topic), (6) adult learn* success (Topic), (7) adult learn* ready (Topic), (8) adult learn* experienc* (Topic), (9) adult learn* strateg* (Topic), (10) adult learn* style* (Topic), (11) adult learn* behav* (Topic), (12) adult learn* expect* (Topic), (13) adult learn* retent* (Topic), (14) adult learn* barrier* (Topic), (15) adult learn* instruct* (Topic), (16) adult learn* design* (Topic), (17) adult learn* issu* (Topic), and (18) adult learn* assess* (Topic). The search queries number 1 to 18 were connected with "OR" operator. Some of these search terms were obtained from published systematic reviews on adult learning in online/blended/distance education, and others were conceptualized based on the authors' initial search and reading of the most cited publications in this field. The outcome of these search queries was later combined with the "online learn* (Topic)" component using "AND" operator to produce online-learning-related motivational research literature.

Next, a series of exclusion steps were performed on the initial search results as follows:

1. The duration of the bibliometric study was set from January 1st, 2000, to November 1st, 2022, and all other years were excluded.

2. A language restriction was imposed on the search so that only articles, reviews, early access papers, and proceeding papers published in English were retrieved and examined.

3. The WOS "*Citation Topics Meso*" function is a new document-level classification schema clustering publications based on their relationships to one another in terms of research topics. Only documents classified under "*Citation Topics Meso*" as "Education & Educational Research" were retained for this bibliometric study, and all other documents were excluded.

Using the above-listed search strategies, we obtained 541 publications in total from 36

publishers, including "Taylor & Francis", "Elsevier", "Spinger Nature", "Elsevier", and "Wiley", etc. To

validate the search results, the first author was responsible for identifying any false positive results

based on the above-listed inclusion/exclusion criteria in collaboration with two other co-authors. The

search for false positive results continued for six days and was carried out by manually reading through

the retrieved documents (i.e., article titles and abstracts) (Sweileh et al., 2018). Furthermore, to search

for the potential false negative results in the obtained bibliometric data, the first author replicated

Sweileh and his colleagues' (2018) strategy to calculate the intraclass correlation coefficient (ICC)

between the number of publications for each of the top 50 active authors and the overall number of

relevant research output of these authors by examining the authors' WOS profiles. As Sweileh et al.

suggested, "an excellent agreement between the two methods with an intraclass correlation above 95%

and a p-value less than 5% is indicative of a high validity of the search strategy" (2018, p. 4). In the

current study, the ICC was 0.977 with a p-value less than 0.001.

At last, the bibliometric data sets obtained and validated using the above-mentioned strategies

were exported in the "full record & cited references" format as both BibTex and xlsx files to be later

loaded onto the *biblioshiny* app for bibliometric analysis. All the following bibliometric data analyses and

data visualization in this study were conducted using the R package *bibliometrix* and its associated

biblioshiny app (Aria & Cuccurullo, 2017) in R 4.2.2 (R Core Team, 2022).
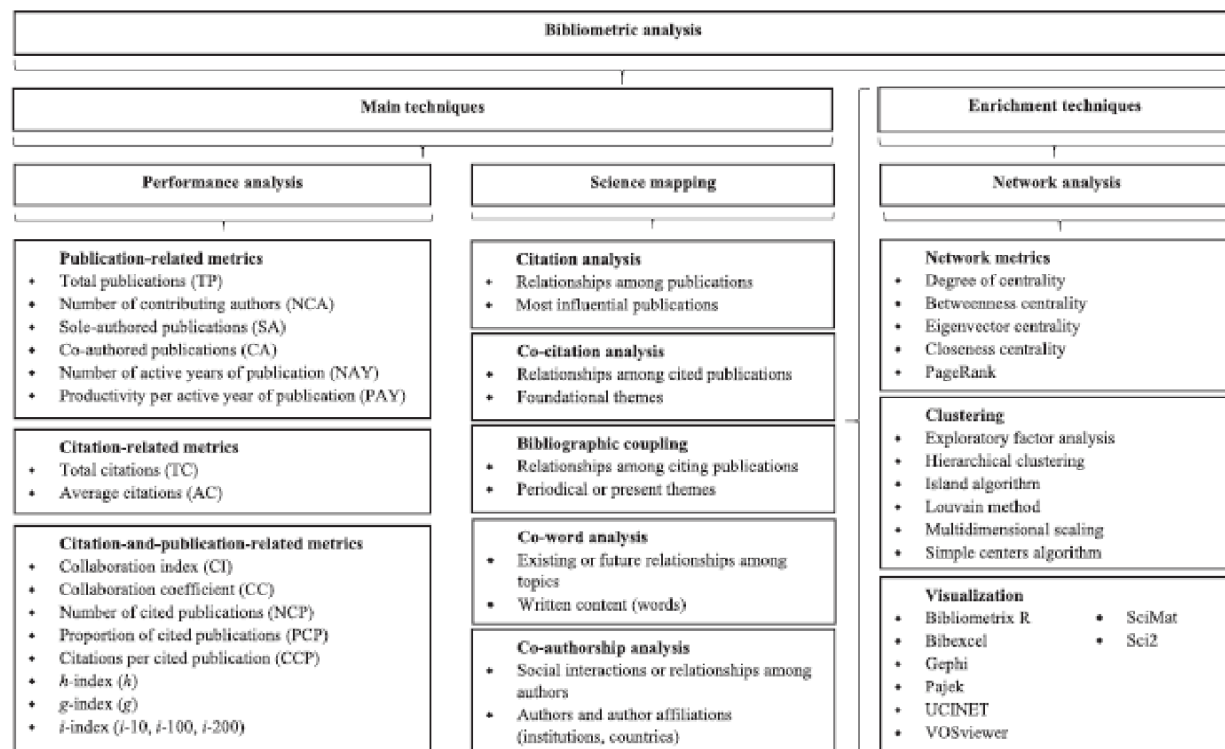
2.2 Bibliometric Analysis

Compared to systematic review and meta-analysis, bibliometric analysis enjoys many

methodological advantages. First, although both can deal with a large amount of literature at once,

bibliometric analysis is capable of analyzing a diverse/heterogeneous range of research studies, and thus

(1) is more robust to various publication biases that can adversely affect the validity of meta-analysis

findings/results, and (2) is not limited to estimate "the overall strength and direction" of only one or

multiple pre-specified "effects or relationships" (Aguinis, Pierce, Bosco, Dalton, & Dalton, 2011, p. 310).

Furthermore, bibliometric analysis is (1) much more versatile than systematic review (e.g., typically

content and thematic analyses) in terms of data analysis techniques (i.e., primarily quantitative

evaluation and interpretation, including performance analysis, science mapping, network analysis,

clustering, visualization with other qualitative interpretation), and (2) much more potent than

systematic review (typically conducted manually by scholars) in processing hundreds or even thousands

of research publications simultaneously for various analyses and interpretations. Please see Figure 1

below illustrating the detailed bibliometric analysis toolbox (Donthu et al., 2021, p. 288):

Figure 1

An Overview of Bibliometric Analysis Techniques for Systematic Literature Reviews

As shown in Figure 1, performance analysis provides basic, descriptive statistics of scholarly

publications in terms of authors, citations, affiliations, and countries, etc. While science mapping uses

various bibliometric tools to identify patterns/trends in scientific research, network analysis further

reveals the conceptual, intellectual, and social collaboration structures of the scientific output in a

particular research field. All three types of bibliometric techniques contribute to the quantitative rigor of

a literature review that otherwise relies primarily on subjective, qualitative evaluation (Abafe et al.,

2022).

The *biblioshiny* app for the R package *bibliometrix* is a Java software developed by Massimo Aria

in 2017 (Aria & Cuccurullo, 2017). Compared to the original R package *bibliometrix*, *biblioshiny* is much

more friendly to new and/or non-coders, with the ease of using coding-free and fully functional web

apps in the *Shiny* package environment (Huang et al., 2021, p. 2).

Results

3.1 RQ1 – Descriptive statistics

Table 2 below provided the summary statistics of the bibliometric dataset: the scholarly

publications on adult online learning motivation included 1,349 authors and 541 documents, increasing

from 2 in 2000 to 77 in 2021, with an average yearly publication of 24.56, average annual citation of

432.8, and an average citation of 0.8 per year per document, respectively. Notably, with an annual

growth rate of 16.45%, publications in this field gained its first momentum in 2010, followed by a second

peak in 2017 which led to the highest productivity period in 2021. These growth trends in scientific

production during the 2000-2022 period might closely relate to the recent technological advancements

in modern communication, internet, media, and online/blended/distance education in general, as well

as the unprecedented impacts of the global COVID-19 pandemic on teaching and learning.

Table 2

Summary Statistics of the Bibliometric Dataset Overview

Description	Statistics
MAIN INFORMATION ABOUT DATA	
Timespan	2000 - 2022
Sources (Journals, Books, etc)	258
Documents	541

|	
Annual Growth Rate %	16.45
Document Average Age	5.15
Average citations per doc	17.6
References	20869
DOCUMENT CONTENTS	
Keywords Plus (ID)	720
Author's Keywords (DE)	1583
AUTHORS	
Authors	1349
Authors of single-authored docs	106
AUTHORS COLLABORATION	
Single-authored docs	118
Co-Authors per Doc	2.8
International co-authorships %	14.42
DOCUMENT TYPES	
article	482
article; early access	31
article; proceedings paper	6
editorial material	1
review	21

Figure 2 (a & b) below illustrates the distribution of annual scientific publications and average

article citation per year. As previously noted, 2021 had the highest productivity, with 77 publications,

accounting for 14% of the total scientific production on this topic in the past two decades.

Figure 2

(a) Annual Scientific Production and (b) Average Citations per Year

a. Annual Scientific Production   b. Average Citations per Year
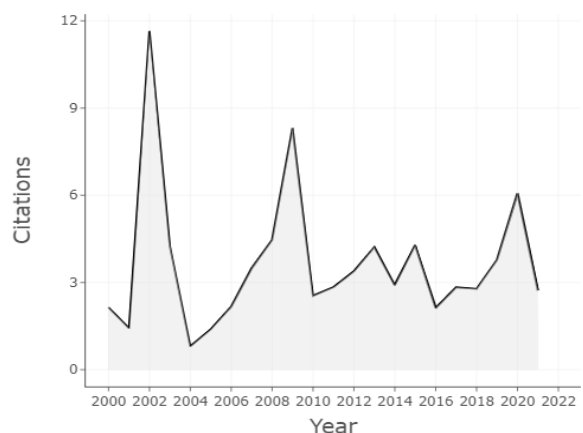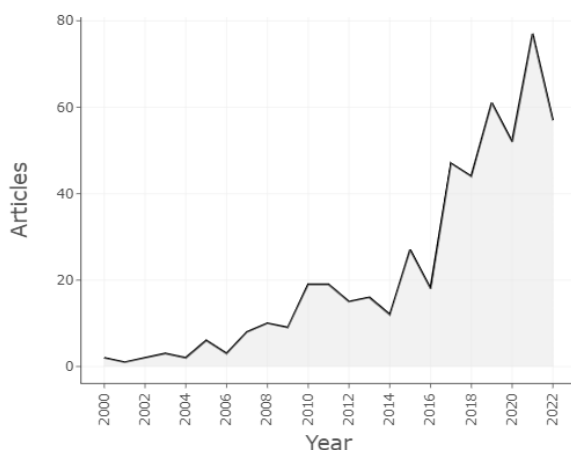
3.2 RQ2 – Most influential journals

Bradford's Law of Scattering was applied to identify the group of the most influential journals. According to Nash-Stewart et al. (2012), "for any single issue, or subject area, the top third (Zone 1 or core) represents the journals that are the most frequently cited in the literature of that subject and that are, therefore, likely to be of highest interest to researchers in the discipline" (p. 135). With "a complete and large bibliography, a well-defined subject, and a limited time frame", Bradford's law can be used to cluster specific number of journals into Zone 1, 2, and 3 based on the prediction that "the number of journals in the second and third zones will be n and n^2 times larger than the first zone respectively" (Nash-Stewart et al., 2012, p. 135).

Using Bradford's law, we identified three clusters/zones based on the cumulative frequency of citations and publications, comprising a total of 258 journals. Zone 1 (the core cluster) included 15 journals consisting of 182 articles, compared to Zone 2 with 65 journals covering 181 articles, and Zone 3 with 178 journals containing 178 articles. Figure 4 below presents Zone 1 (the most salient cluster) with the 15 most productive journals on adult online learning motivation.

Figure 3

Source Growth of the 15 Most Productive Journals (Zone 1) on Adult Online Learning Motivation (2000-
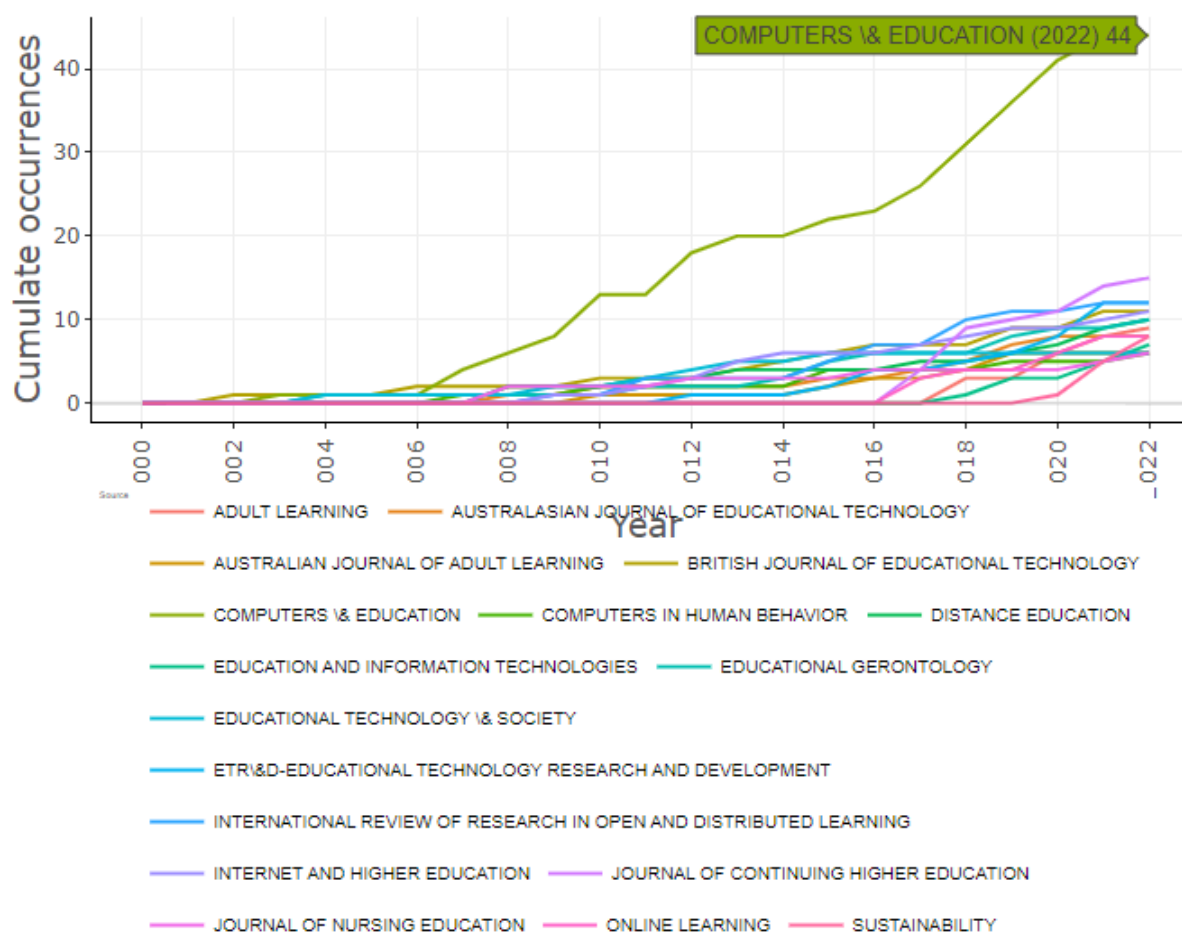
2022)

Table 3 below shows that Zone 1 (the core cluster) hosted 15 highly productive journals with

182 publications, indicating a higher cumulative frequency of citations/publications than other two

clusters (Zone 2 & Zone 3). Among these 15 journals, *Computers and Education* followed by *Journal of*

Continuing Higher Education were found to have the highest productivity. Remarkably, it was also noted

in Table 4 that *Computers and Education* ranked No. 1 and far exceeded all other core journals in Zone 1

across all source productivity and impact indicators (i.e., *h*-index, *g*-index, *m*-index, total citations, &

number of publications).

Table 3

Zone 1 Journals Productivity and Impact Statistics

Sources	*h*-index	*g*-index	*m*-index	TC	NP	PY_Start
COMPUTERS \& EDUCATION	29	44	1.45	2816	44	2003
JOURNAL OF CONTINUING HIGHER EDUCATION	5	9	NA	89	19	NA
ETR\&D-EDUCATIONAL TECHNOLOGY RESEARCH AND DEVELOPMENT	6	12	0.545	163	12	2012
INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTRIBUTED LEARNING	7	12	0.5	174	12	2009
BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY	9	11	0.429	573	11	2002
INTERNET AND HIGHER EDUCATION	9	11	0.643	643	11	2009
ADULT LEARNING	5	7	NA	55	10	NA
DISTANCE EDUCATION	7	10	0.467	399	10	2008
EDUCATIONAL GERONTOLOGY	6	9	0.316	96	10	2004
AUSTRALASIAN JOURNAL OF EDUCATIONAL TECHNOLOGY	7	8	0.467	113	8	2008
ONLINE LEARNING	4	8	0.667	69	8	2017
SUSTAINABILITY	3	3	1	16	8	2020
EDUCATION AND INFORMATION TECHNOLOGIES	3	6	0.6	42	7	2018
AUSTRALIAN JOURNAL OF ADULT LEARNING	6	6	0.462	115	6	2010
COMPUTERS IN HUMAN BEHAVIOR	5	6	0.313	136	6	2007

Note. TC = Total Citations, NP = Number of Publications, PY = Publication Year
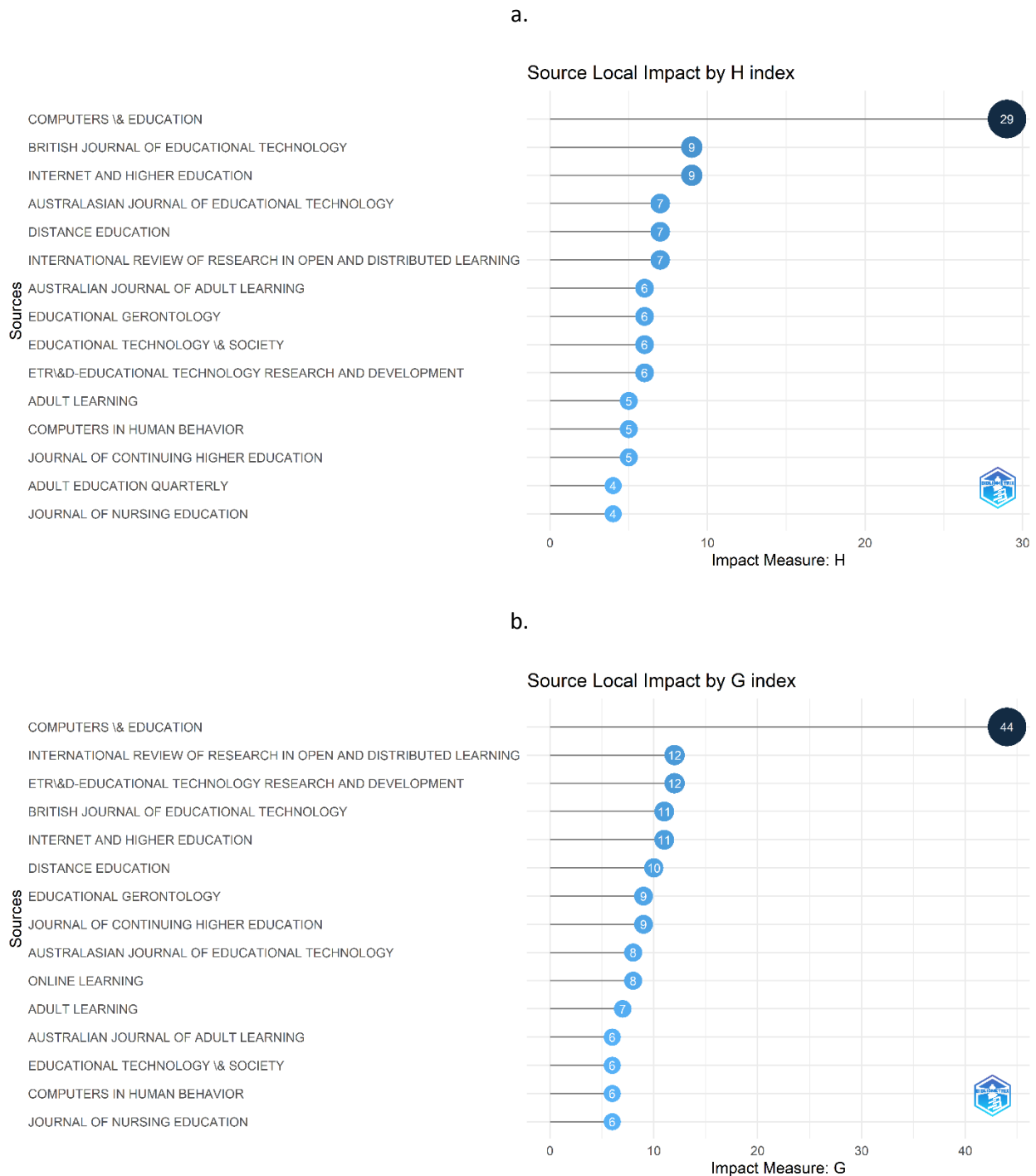
As one of the journal quality metrics, the *h*-index of a journal is defined as the largest number *h*

such that at least *h* articles in that publication were cited at least *h* times each. For example, a journal

with a *h*-index of 20 has published 20 articles that have been cited 20 or more times (Hirsch, 2005).

Figure 4-a illustrates the top 15 journals based on their *h*-index ranking. *Computers and Education*,

British Journal of Educational Technology, and *Internet and Higher Education* were identified as the top

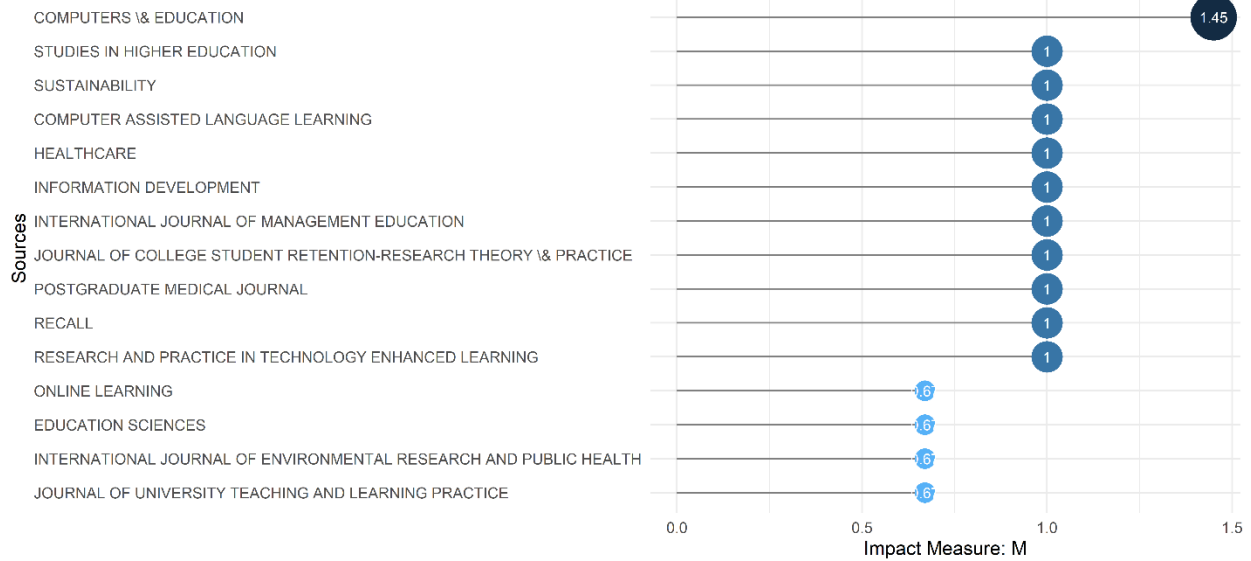three journals on adult online learning motivation with the highest *h*-index values.

Comparatively, *g*-index is introduced as an improvement of the *h*-index to measure the global

citation performance of a set of articles, as it gives more weight to the highly cited articles compared to

the *h*-index (Egghe, 2006). Figure 4-b displayed the top 15 journals based on their *g*-index ranking.

Slightly different from the *h*-index based journal ranking, the top three journals based on *g*-index were

Computers and Education, *International Review of Research in Open and Distributed Learning,* and

ETR&D-Educational Technology Research and Development.

Finally, *m*-index measures the slope or rate of increase of the journals' *h*-index over time and is

considered beneficial in normalizing between the newcomers and those mature/established players

(Hirsch, 2005). Hirsch (2005) recommended the range of acceptable *m*-values for judging the journals'

scientific impact: Average ($m < 1.0$), Above Average ($1.0 < m < 2.0$), Excellent ($2.0 < m < 3.0$), and Stellar

($m > 3.0$). Figure 4-c showed the top 15 journals based on their *m*-index ranking and the top three

journals were *Computers and Education*, *Studies in Higher Education,* and *Sustainability*, which is notably

different from both the *h*-index and *g*-index journal rankings.

Figure 4

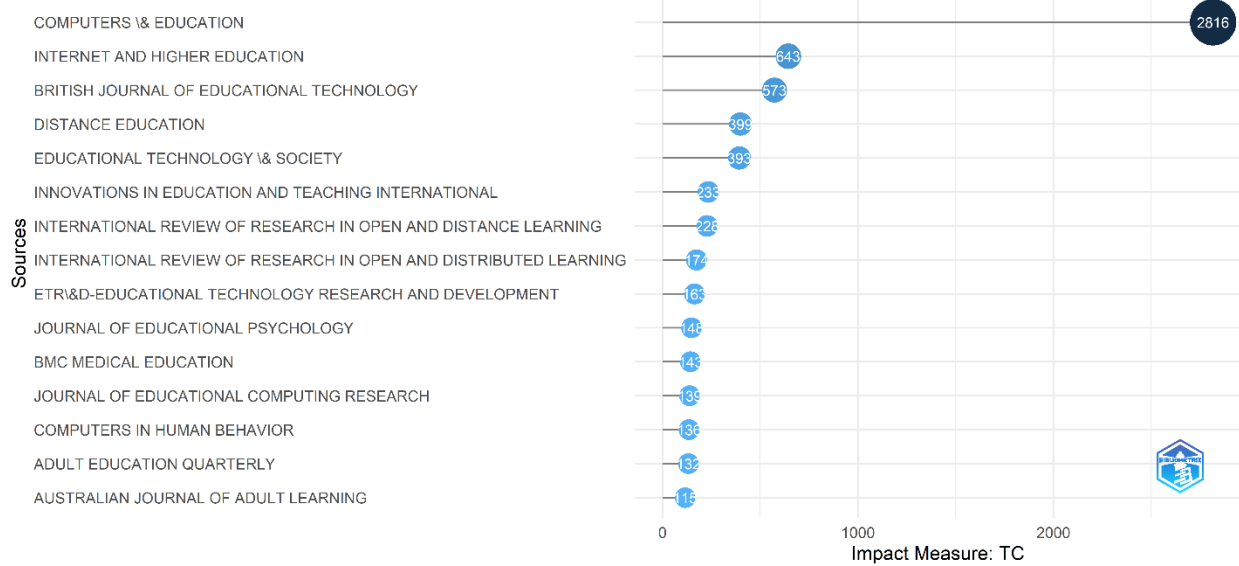*Illustration of the Top 15 Most Influential Journals Based on Various Journal Quality Metrics*
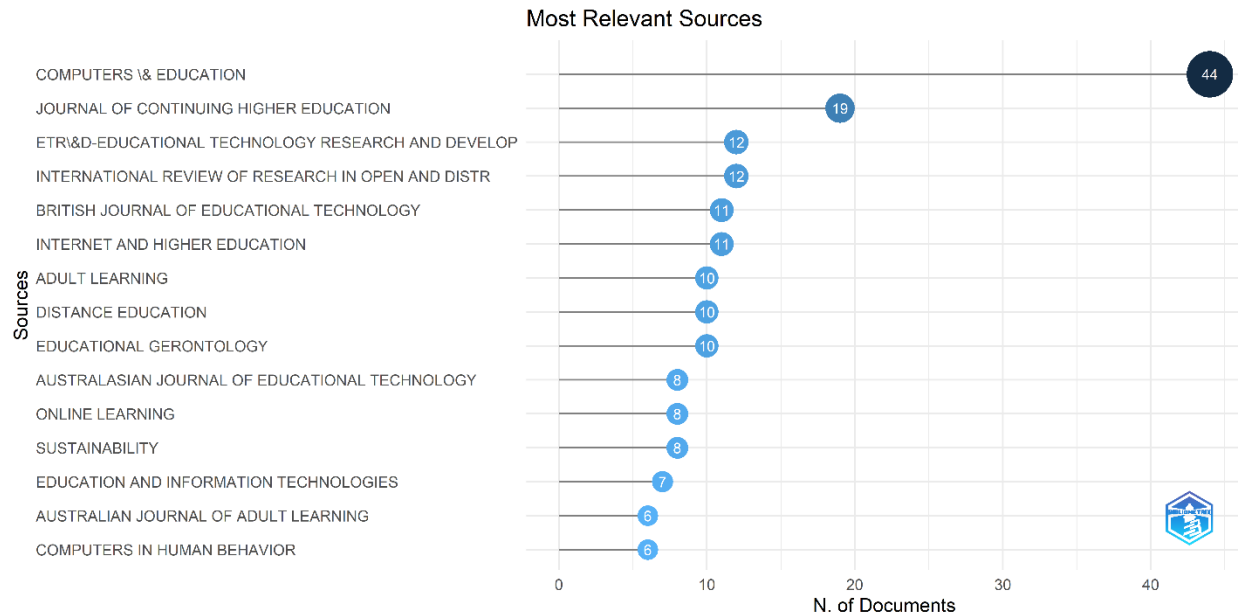
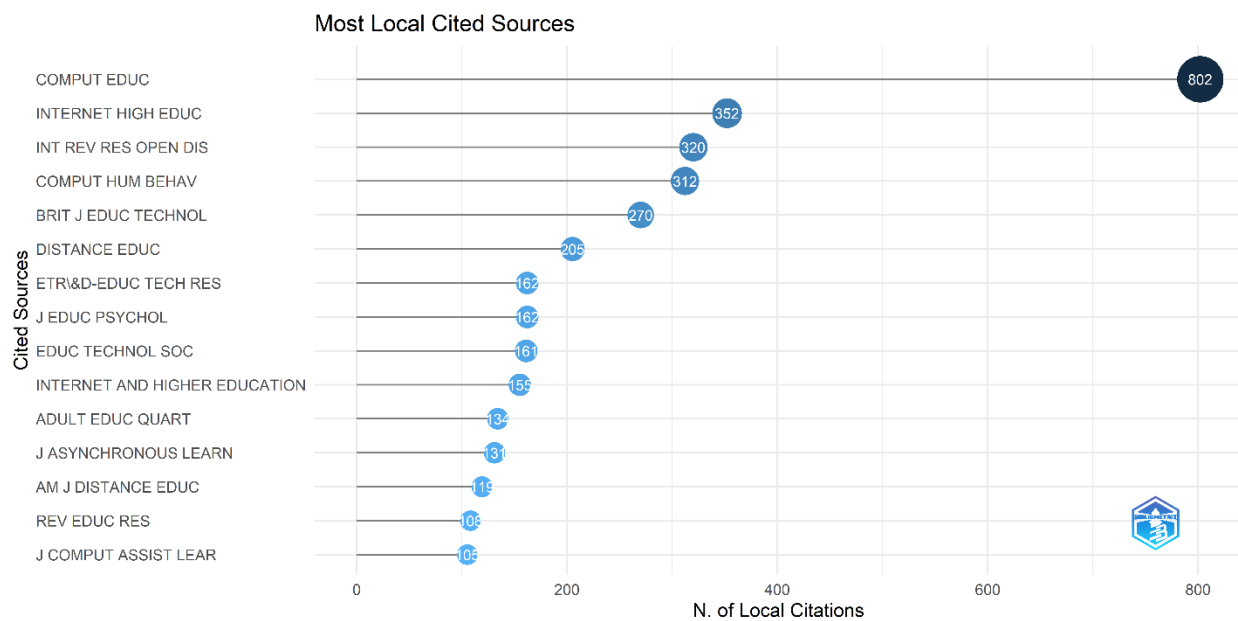a.

b.

c.

Source Local Impact by M index

Sources	Impact Measure: M
COMPUTERS \& EDUCATION	1.45
STUDIES IN HIGHER EDUCATION	1
SUSTAINABILITY	1
COMPUTER ASSISTED LANGUAGE LEARNING	1
HEALTHCARE	1
INFORMATION DEVELOPMENT	1
INTERNATIONAL JOURNAL OF MANAGEMENT EDUCATION	1
JOURNAL OF COLLEGE STUDENT RETENTION-RESEARCH THEORY \& PRACTICE	1
POSTGRADUATE MEDICAL JOURNAL	1
RECALL	1
RESEARCH AND PRACTICE IN TECHNOLOGY ENHANCED LEARNING	1
ONLINE LEARNING	.67
EDUCATION SCIENCES	.67
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	.67
JOURNAL OF UNIVERSITY TEACHING AND LEARNING PRACTICE	.67

d.

Source Local Impact by TC index

Sources	Impact Measure: TC
COMPUTERS \& EDUCATION	2816
INTERNET AND HIGHER EDUCATION	643
BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY	573
DISTANCE EDUCATION	399
EDUCATIONAL TECHNOLOGY \& SOCIETY	393
INNOVATIONS IN EDUCATION AND TEACHING INTERNATIONAL	233
INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING	228
INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTRIBUTED LEARNING	174
ETR\&D-EDUCATIONAL TECHNOLOGY RESEARCH AND DEVELOPMENT	163
JOURNAL OF EDUCATIONAL PSYCHOLOGY	148
BMC MEDICAL EDUCATION	143
JOURNAL OF EDUCATIONAL COMPUTING RESEARCH	139
COMPUTERS IN HUMAN BEHAVIOR	136
ADULT EDUCATION QUARTERLY	132
AUSTRALIAN JOURNAL OF ADULT LEARNING	115

e.

Most Relevant Sources

f.

Most Local Cited Sources

3.3 RQ2 – Most active authors

A total of 1349 authors contributed 541 publications on adult online learning motivation. Figure 5-a shows the top 10 most relevant authors in terms of the number of publications. Chang Zhu was identified as the most productive author, with 14 articles (2.6% of all publications included on this topic),

followed by Celine Cocquyt (1.1% of all articles) and Cathy Stone (1.1% of all articles). Regarding the

number of citations in this field, Figure 6-f showed that Carol Evans was ranked first (388 citations),

followed by Sarah T. Maddison (345 citations), Margaret Mazzolini (345 citations), Hyoseon Choi (342

citations), and Ji-Yong Park (319 citations).

Table 4

The Top Ten Most Active Authors on Adult Online Learning Motivation

Sources	*h*-index	*g*-index	*m*-index	TC	NP	PY_Start	Fractionalized
ZHU C	10	14	1.429	261	14	2016	3.80
COCQUYT C	5	6	0.714	109	6	2016	1.27
STONE C	5	6	0.714	163	6	2016	2.23
TSAI C	5	5	0.357	182	5	2009	1.67
VANWING T	5	5	0.714	89	5	2016	1.02
DE G M	4	4	0.667	48	4	2017	0.77
KE F	4	4	0.286	272	4	2009	3.00
PYNOO B	4	4	1.000	62	4	2019	0.67
CHOI H	4	4	0.214	342	4	2009	2.33
LEE J	3	4	0.200	30	4	2008	1.45

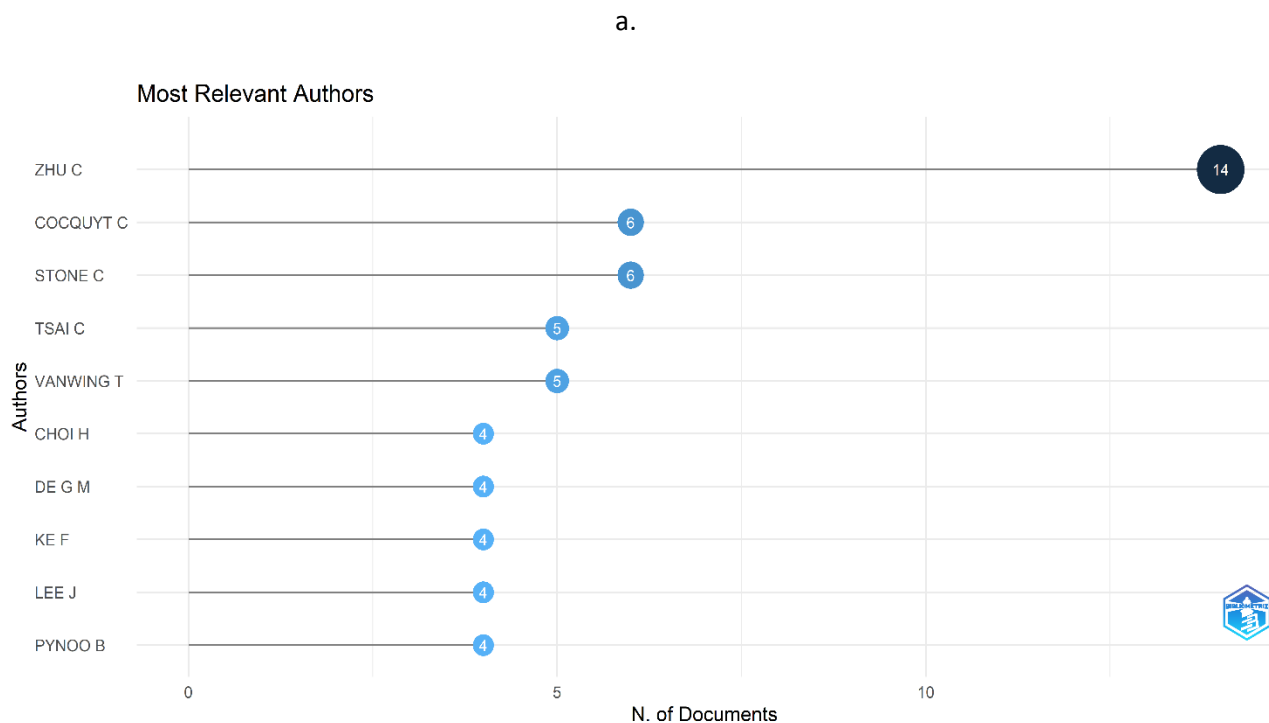*Note*. TC = Total Citations, NP = Number of Publications, PY = Publication Year

Notably, as shown in Figure 5-a and Figures 5-(c-e), Chang Zhu was the most active author on

adult online learning motivation across the total number of publications, *h*-index, *g*-index, and *m*-index,

and her works influenced the major research lines in this field ever since 2016. While Figure 5-b and

Figure 5-f indicate that both Hyoseon Choi and Ji-Yong Park had higher numbers of local and total

citations than Chang Zhu, suggesting that these two established scholars had had a longer presence in

this research field related to adult online learning motivation.

Furthermore, Figure 5-g displayed the most active authors' scholarly production from 2000 to 2022. It was found that most of the articles by these authors had been published after 2016, and two peaks of the growth trend over the past two decades were identified as 2017 and 2019. Remarkably though, the outbreak of the global COVID-19 pandemic in 2019 seemed to have attracted some new rising scholars, such as Bram Pynoo, Anh Nguyet Diep, and Koen DePryck, to become interested and actively engage in this research field.

Finally, Figure 5-h shows that 91.8% of the 1349 authors had one single publication, and only 27 scholars authored three or more publications on this topic, suggesting a lack of continuing prominent research agenda on adult online learning motivation for most researchers in this field.
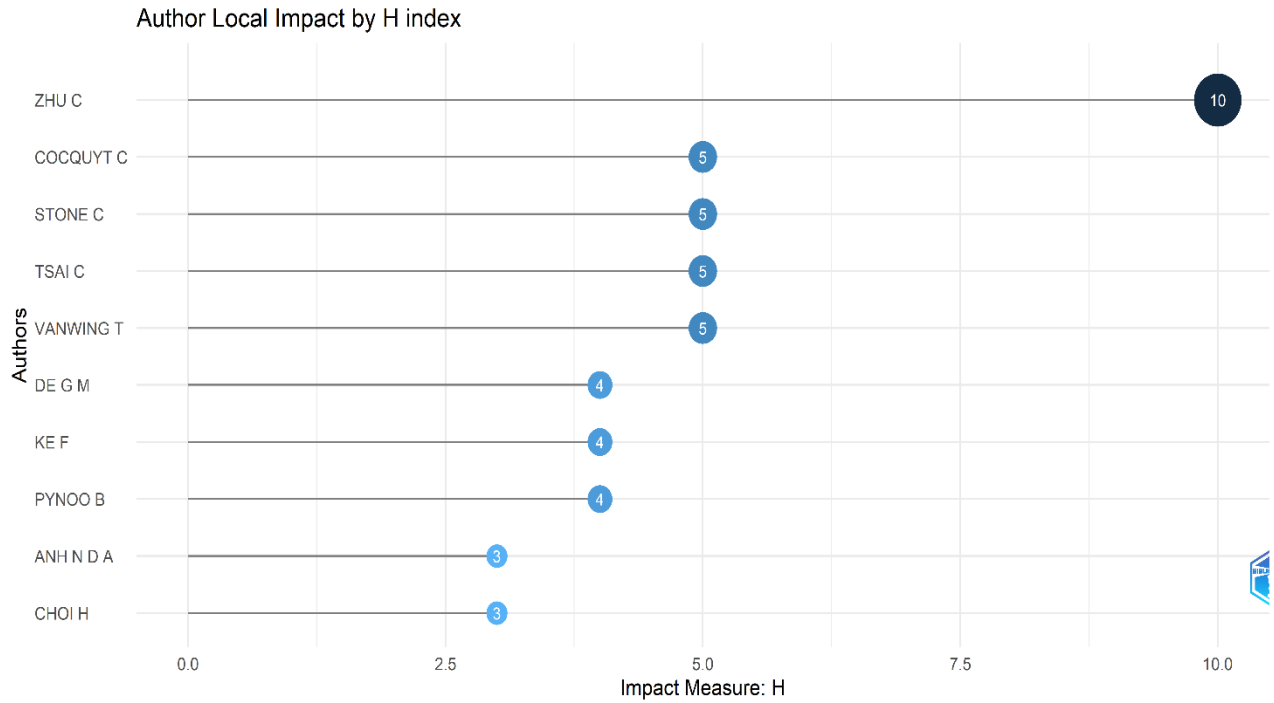
Figure 5

Illustration of the Top 10 Most Influential Authors Based on Various Scholarly Output Quality Metrics
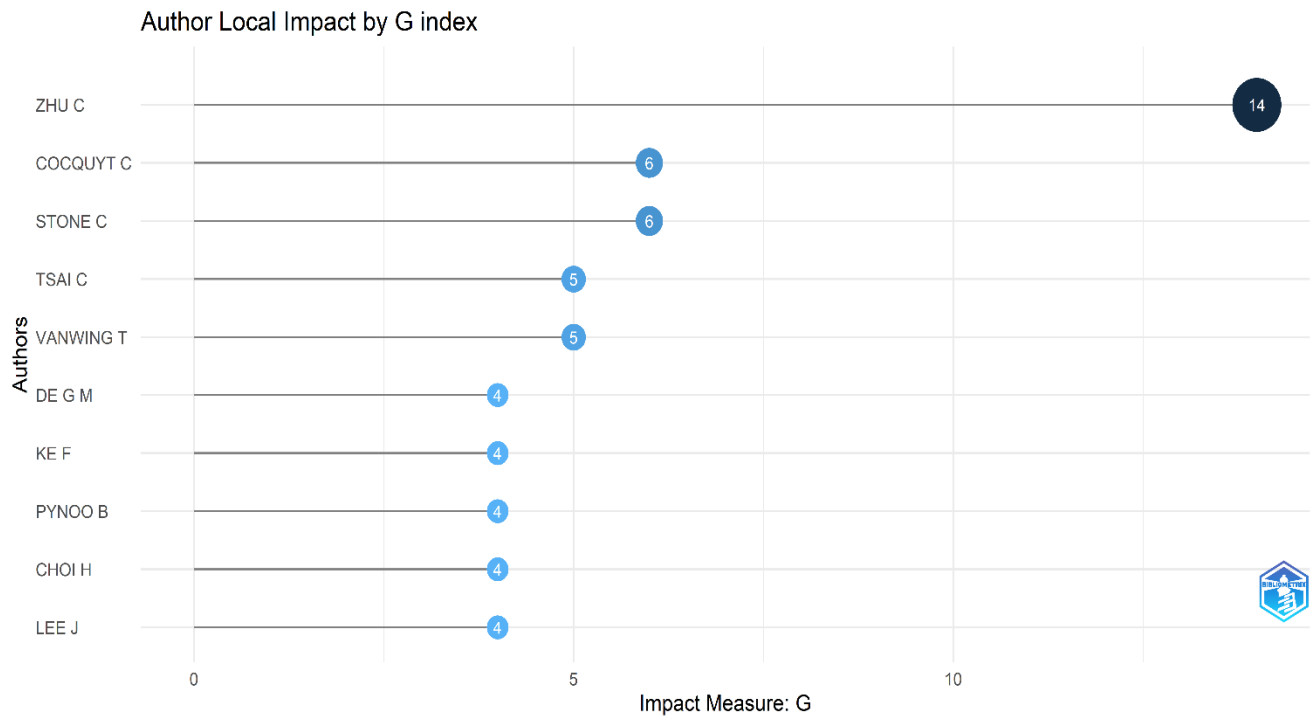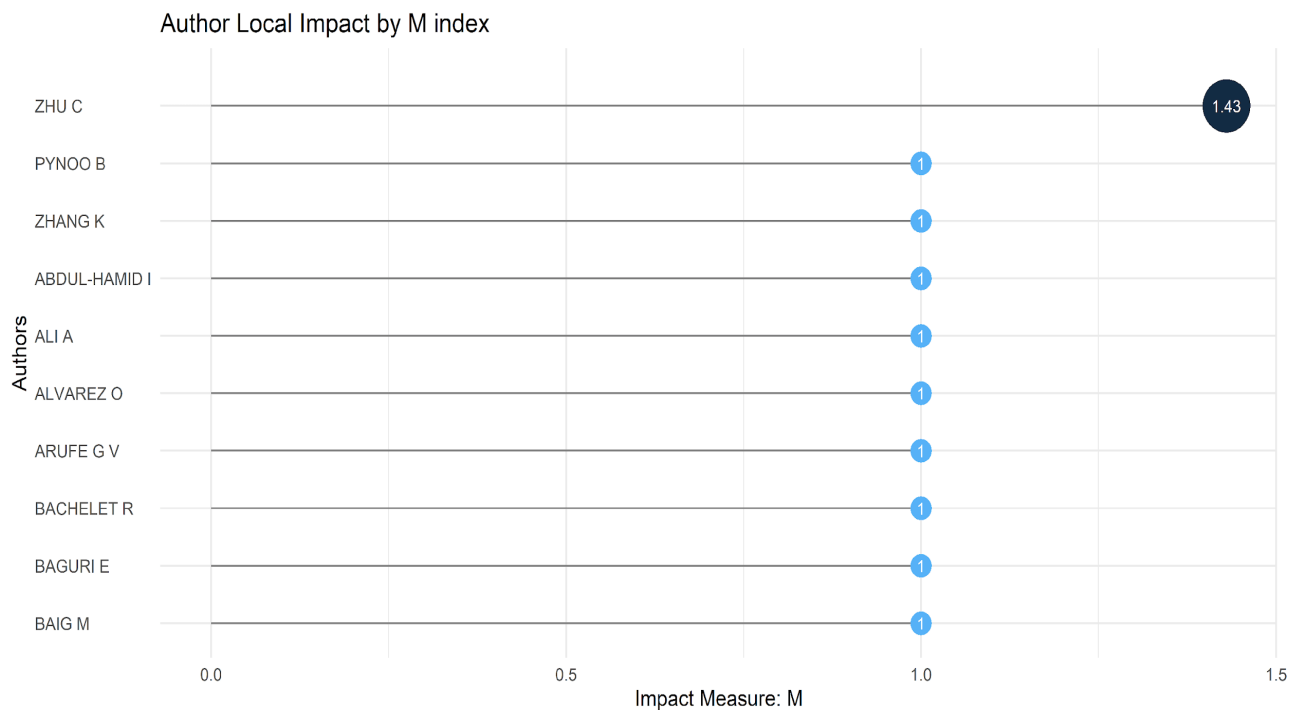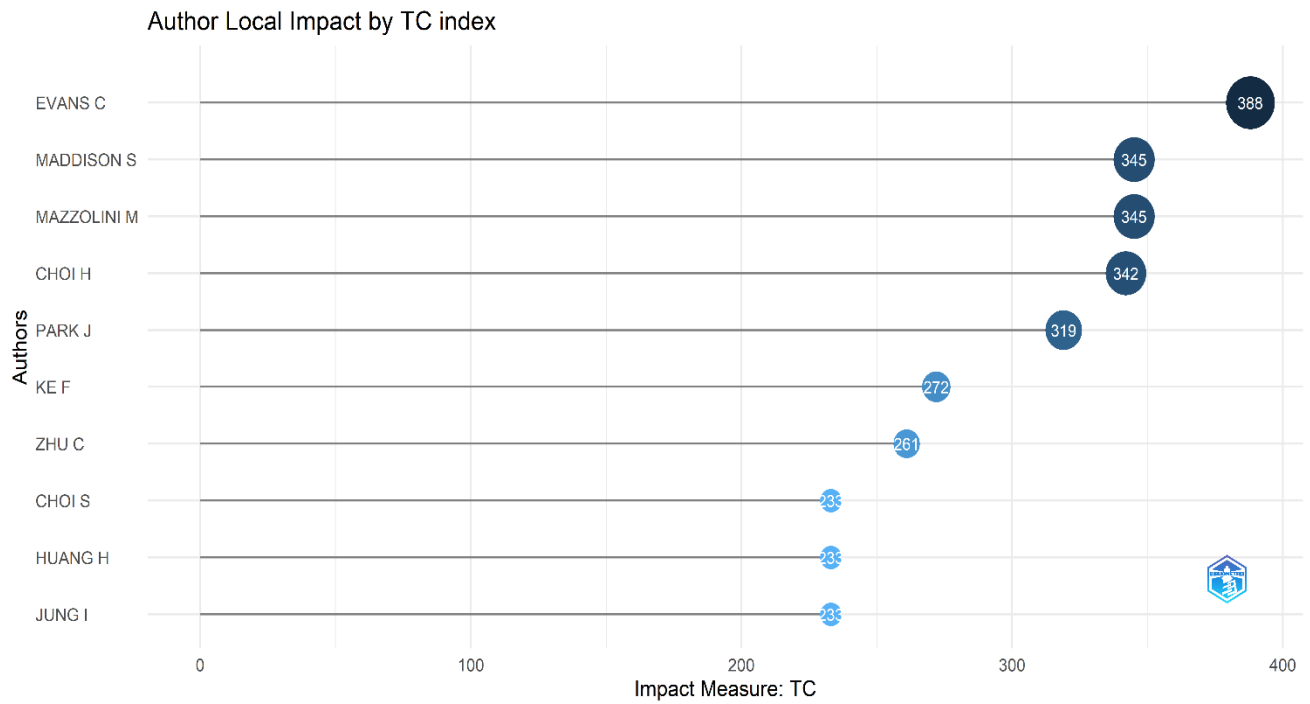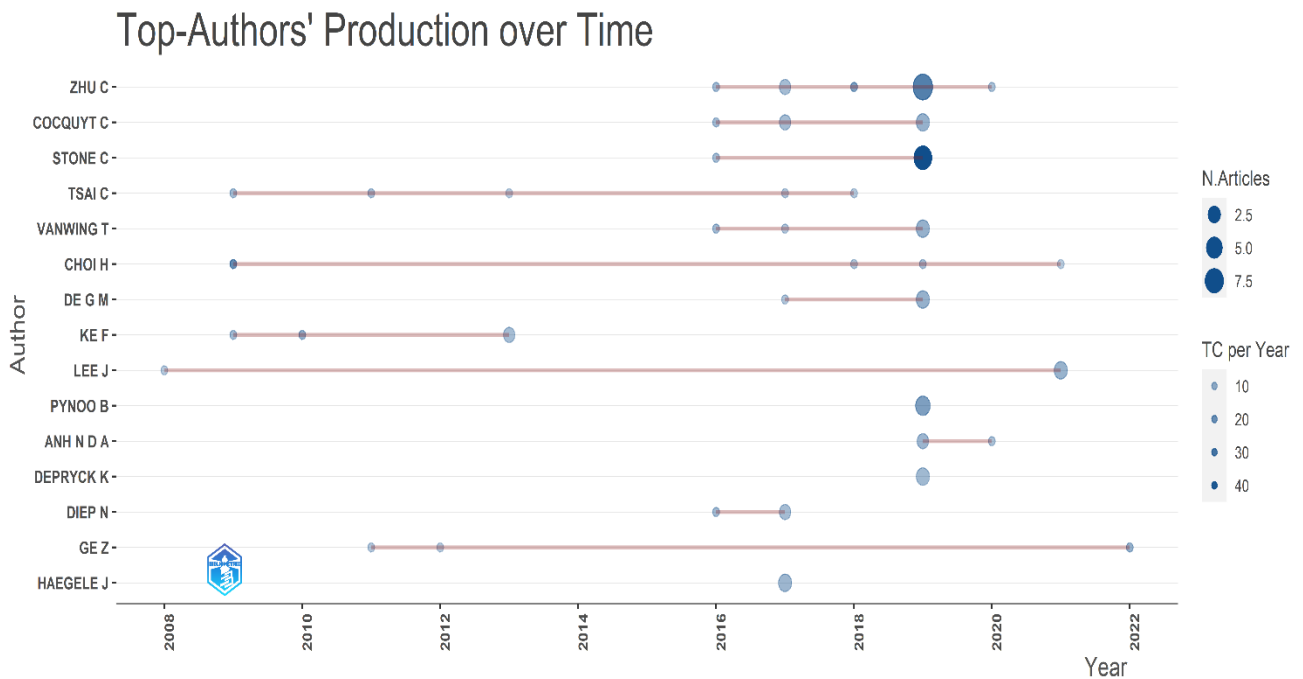
a.

b.

Most Local Cited Authors

c.

Author Local Impact by H index

d.

Author Local Impact by G index

e.

Author Local Impact by M index

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BIBLIOMETRIC ANALYSIS OF ADULT ONLINE LEARNING MOTIVATION   22

f.

g.

h.

The Frequency Distribution of Scientific Productivity

3.4 RQ2 – Most productive institutes & countries

Global contributions to research on adult online learning motivation were analyzed and

illustrated in Figure 6. Specifically, Table 5 below presents the contributions to the total citations from

different countries.

Table 5

The Top Ten Most Cited Countries in Scholarly Research on Adult Online Learning Motivation

Country Name	Total Citations	Average Article Citations
USA	2953	14.55
UNITED KINGDOM	1183	28.17
KOREA	839	69.92
CHINA	828	18.82
AUSTRALIA	769	22.62
CANADA	371	15.46
BELGIUM	334	19.65
ITALY	311	38.88
MALAYSIA	291	26.45

SPAIN	275	16.18

A total of 51 countries engaged in research related to adult online learning motivation. Figure 6-a presented the most relevant 10 countries in this field by ranking the number of publications produced from the corresponding authors' countries. Results showed that the United States produced the highest number of publications (203, 37.5% of all publications), followed by China (44, 8.1%) and the United Kingdom (42, 7.8%). Overall, Single Country Publications (SCP) substantially outnumbered Multiple Country Publications (MCP), indicating a generally weak presence of international research collaboration on adult online learning motivation. Among the top ten most productive countries, Korea and China had the highest Multiple Country Publications (MCP) ratios, as the two most active countries generating and engaging in international research on this topic.

Figure 6-b demonstrates the most cited countries on this topic by ranking the number of citations received by the corresponding authors' countries. It was found that the United States contributed the greatest number of citations (2953, 31.0% of all citations), followed by the United Kingdom (1183, 12.4%) and Korea (839, 8.8%). Interestingly, the ranking order of Average Article Citations was slightly different from that of Total Citations in Table 6 above. Among the top 10 countries ranked by Total Citations, articles from Korea had the highest number in terms of Average Article Citations, suggesting the average quality of the publications from Korea outperformed all other countries.

Figure 6-c illustrated the top 10 most productive countries' scientific output over the 2000-2022 timespan. While most countries maintained similar stable growth trends over time, the scholarly production of the United States on adult online learning motivation really took off after 2016 and had undeniably outperformed all others in this research field.
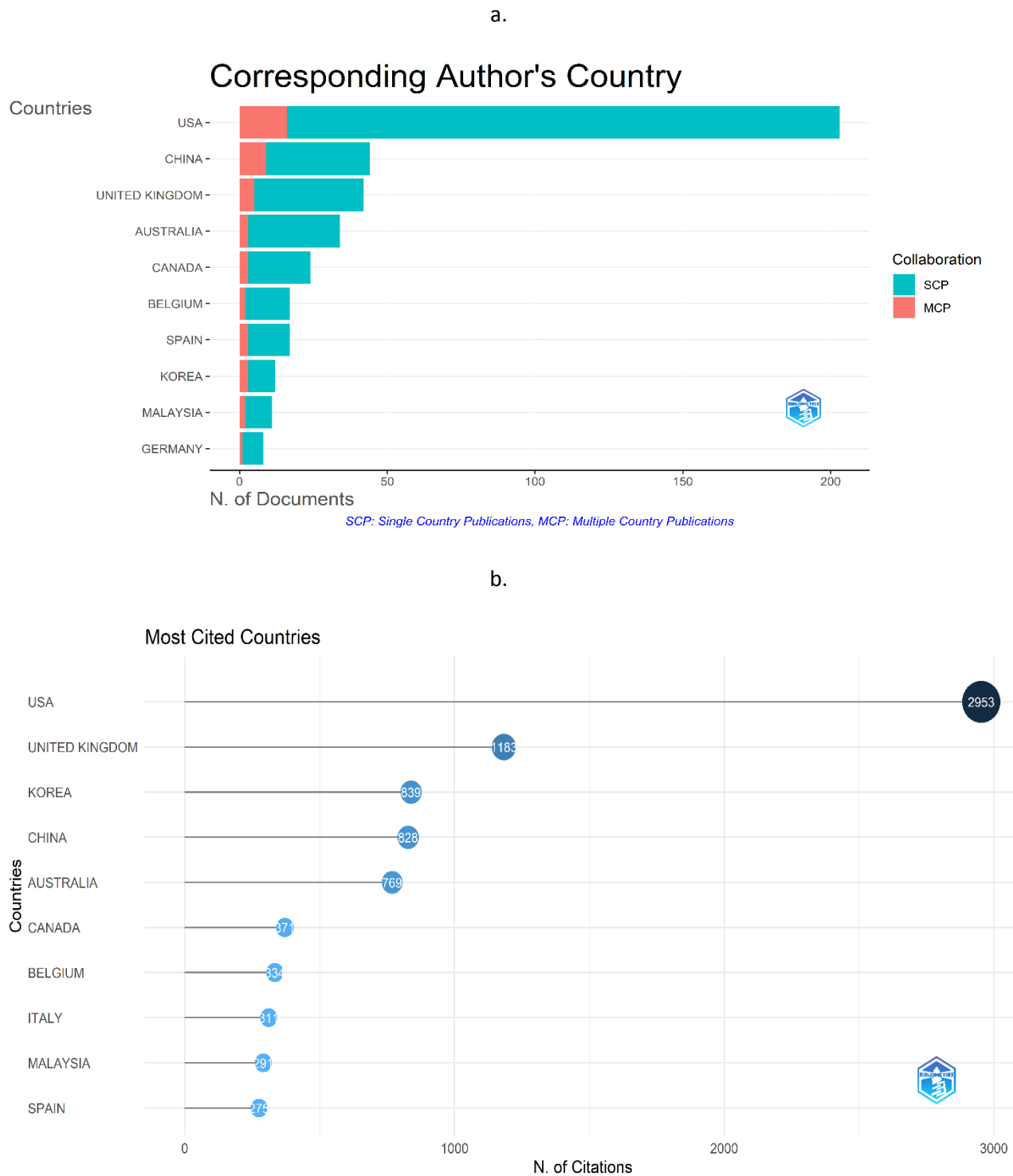
Table 6

The Top Ten Most Productive Institutions in Scholarly Research on Adult Online Learning Motivation
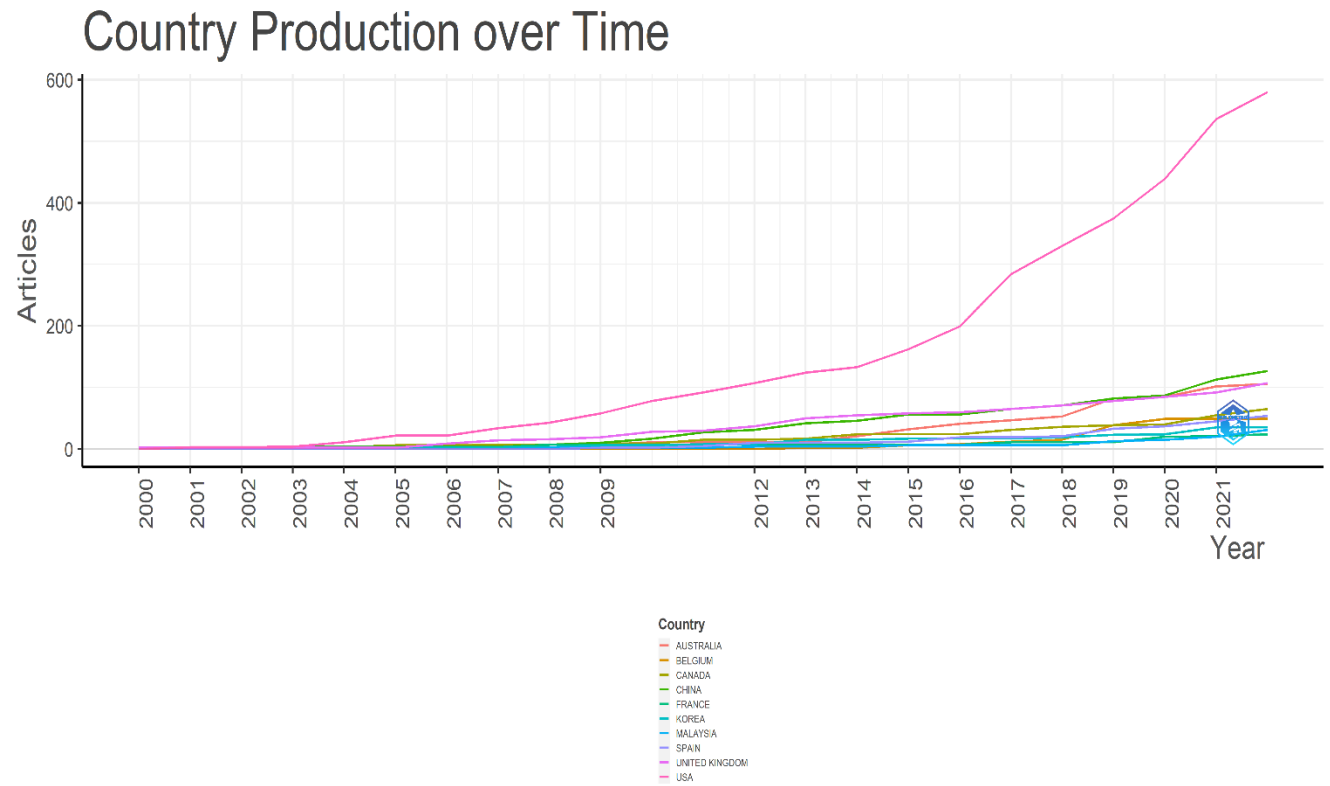
Institution Name	Articles	Proportion
VRIJE UNIV BRUSSEL	28	5.18%
OPEN UNIV	19	3.51%
PENN STATE UNIV	16	2.96%
UNIV TASMANIA	16	2.96%
UNIV FLORIDA	12	2.22%
UNIV NEBRASKA	12	2.22%
UNIV WOLLONGONG	12	2.22%
DUBLIN CITY UNIV	11	2.03%
UNIV NEWCASTLE	11	2.03%
UNIV TEKNOL MALAYSIA	11	2.03%

A total of 622 institutions were involved in research on adult online learning motivation. Table 6 and Figure 6-d both show that most publications originated from affiliations in Europe and USA, with Vrije Universiteit Brussel of Belgium producing the highest number of articles (28 records, 5.2%) on this topic, followed by Open University of United Kingdom (19 records, 3.5%) and the Pennsylvania State University of USA (16 records, 3.0%).
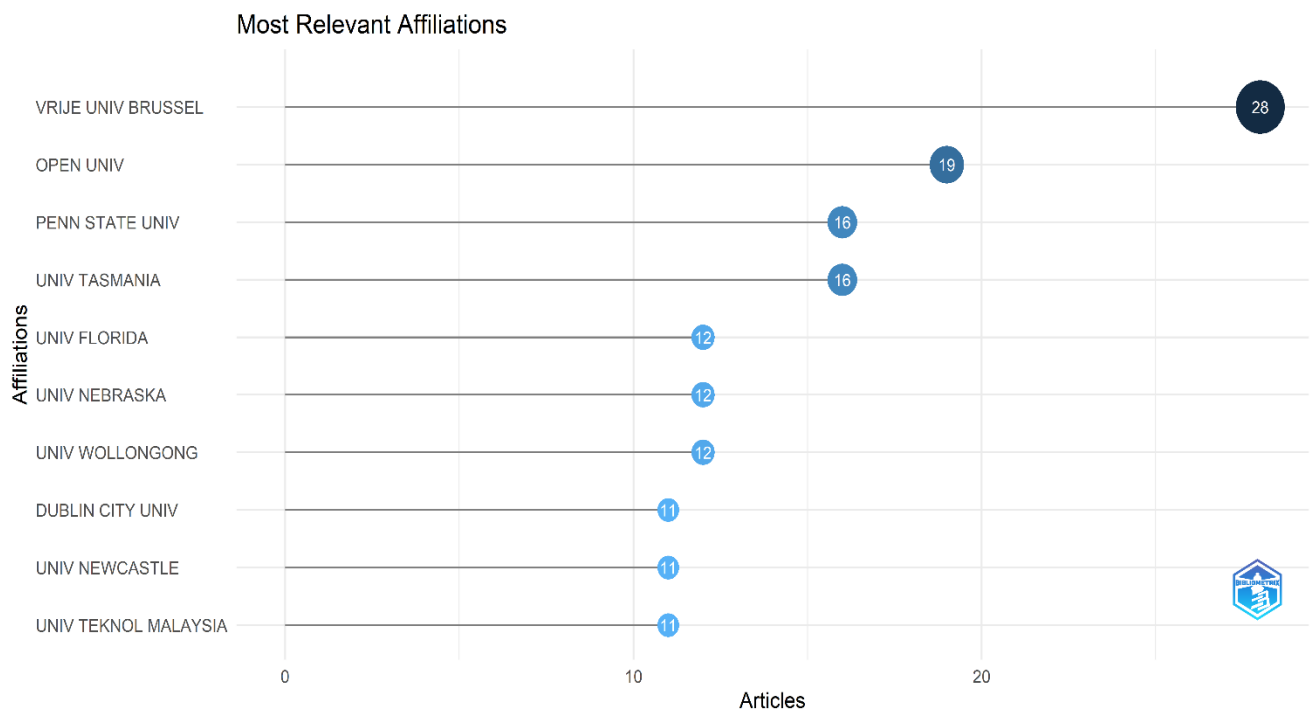
Figure 6-e illustrates the top 10 affiliations' production over time. It was clearly seen that most of the top 10 most productive institutions began their research on adult online learning motivation around 2007 and had ever since maintained relatively stable scientific output every year. In contrast, Vrije Universiteit Brussel of Belgium, the top player, came into this field rather late around 2016, but kept growing at an unbelievable pace and finally outperformed all other institutions in scientific production on adult online learning motivation.

Figure 6

Illustration of the Top 10 Most Productive Countries and Institutions in Research on Adult Online
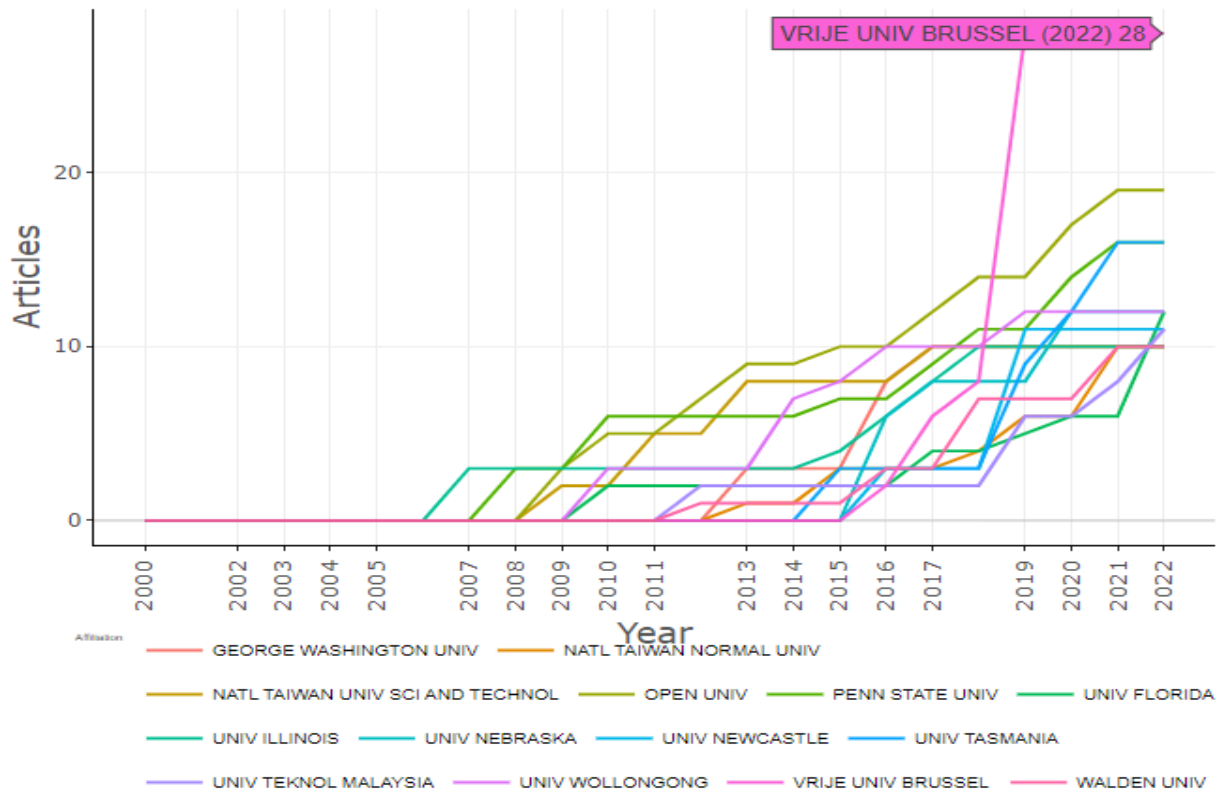
Learning Motivation

a.

SCP: Single Country Publications, MCP: Multiple Country Publications

b.

c.

Country Production over Time

Country
- AUSTRALIA
- BELGIUM
- CANADA
- CHINA
- FRANCE
- KOREA
- MALAYSIA
- SPAIN
- UNITED KINGDOM
- USA

d.

Most Relevant Affiliations

Affiliations	Articles
VRIJE UNIV BRUSSEL	28
OPEN UNIV	19
PENN STATE UNIV	16
UNIV TASMANIA	16
UNIV FLORIDA	12
UNIV NEBRASKA	12
UNIV WOLLONGONG	12
DUBLIN CITY UNIV	11
UNIV NEWCASTLE	11
UNIV TEKNOL MALAYSIA	11

e.

3.5 RQ3 – Most impactful documents

Table 7-a lists the information of the top 10 global cited (i.e., receiving citations in the global

scholarly research body and not only limited to the specific research field of adult online learning

motivation) documents related to adult online learning motivation from 2000 to 2022. Among the top

10 global cited articles, seven were published before 2010 and only three published in 2011, 2012, and

2020 respectively. The latest publication by Rasheed et al. (2020) was titled "Challenges in the Online

Component of Blended Learning: A Systematic Review" and had received the highest average citation

per year since 2020. In their systematic review, Rasheed and colleagues conducted a systematic review

aiming to identify the challenges in the online component of blended learning from students, teachers,

and educational institutions perspectives. They found that (1) the major challenges faced by students

related to effective self-regulation and use of learning technology, (2) teachers challenges were mainly

on the use of technology for teaching, and (3) institutional challenges focused on the provision of

suitable instructional technology and effective training support to teachers. Comparatively, the

publication by Evans (2008) titled "The Effectiveness of M-Learning in the Form of Podcast Revision

Lectures in Higher Education" received the highest total global citations during the 2000-2022 period.

Evans conducted an empirical quantitative survey study to understand higher education students'

attitudes toward lectures, podcasts, notes, textbooks, and multimedia e-learning systems. The results

confirmed (1) students' preference of podcast as a more effective revision tool to their textbooks and

study notes, and (2) students' preference of the learning material in the form of a podcast to a

traditional lecture or textbook.

In sum, the seven most global cited publications before 2010 seem to have laid the foundation

for research lines to study motivating adult online learners from the technical, andragogical, and

participatory perspectives. While the three recent publications after 2010 seemed to have shifted the

focus from study of specific aspects of adult online learning motivation towards the holistic view and

transformative nature of adult online learning process that presents both opportunities and challenges.

In comparison, as shown in Table 7-b, seven of the top 10 local cited articles were published

after 2010 and only three published before 2010. The most locally cited publication was titled "Factors

Influencing Adult Learners' Decision to Drop Out or Persist in Online Learning" (Park & Choi, 2008). In

this study, the authors conducted a quantitative survey research with 147 adult online learners to

compare whether persistent learners and dropouts significantly differed in individual characteristics

(i.e., age, gender, and educational level), external factors (i.e., family, and organizational supports), and

internal factors (i.e., satisfaction and relevance as sub-dimensions of motivation). They found statistical

differences across the two groups in perceptions of family and organizational support, and satisfaction

and relevance. These factors combined with individual learner characteristics could predict dropouts for

adult online learners. Many other most local cited publications also echoed this research line of

identifying and testing various motivators (e.g., affective, intellectual, social, and instructional factors) to predict positive and/or negative adult online learning outcomes. Interestingly, another most local cited article by Zembylas (2008) (titled "Adult Learners' Emotions in Online Learning") briefly discussed research needs related to gender effect in research on adult online learning motivation, which had later become one of the trendy topics in this field since 2016.

A brief cross examination revealed only three overlapping publications across the two lists of the top 10 most global vs. local cited publications: "Factors Influencing Adult Learners' Decision to Drop Out or Persist in Online Learning" (Park & Choi, 2009), "Sage, Guide or Ghost? The Effect of Instructor Intervention on Student Participation in Online Discussion Forums" (Mazzolini & Maddison, 2003), and "Cutting the Distance in Distance Education: Perspectives on What Promotes Positive, Online Learning Experiences" (Boling et al., 2012).

Table 7

a. The Top 10 Most Global Cited Documents, b. The Top 10 Most Local Cited Documents

a.

Title	TC[1] (TC per Year)	First Author (PY[2])	DOI
The Effectiveness of M-Learning in the Form of Podcast Revision Lectures in Higher Education	388 (25.87)	Chris Evans (2008)	10.1016/j.compedu.2007.09.016
Factors Influencing Adult Learners' Decision to Drop Out or Persist in Online Learning	305 (21.79)	Ji-Hye Park (2009)	jstor.org/stable/jeductechsoci.12.4.207
Toward Constructivism for Adult Learners in Online Learning Environments	233 (11.1)	Hsiu-Mei Huang (2002)	10.1111/1467-8535.00236
Effects of Different Types of Interaction on Learning Achievement, Satisfaction and Participation in Web-Based Instruction	233 (11.1)	Insung Jung (2002)	10.1080/14703290252934603
The Technological Dimension of a Massive Open Online Course: The Case of the CCK08 Course Tools	218 (15.57)	Antonio Fini (2009)	10.19173/irrodl.v10i5.643
Challenges in the Online Component of Blended Learning: A Systematic Review	203 (67.67)	Rasheed Abubakar Rasheed (2020)	10.1016/j.compedu.2019.103701
Sage, Guide or Ghost? The Effect of Instructor Intervention on Student Participation in Online Discussion Forums	189 (9.45)	Margaret Mazzolini (2003)	10.1016/S0360-1315(02)00129-X
Transforming Online Teaching Practice: Critical Analysis of the Literature on the Roles and Competencies of Online Teachers	187 (15.58)	Evrim Baran (2011)	10.1080/01587919.2011.610293

Title		First Author (PY)	DOI
Cutting the Distance in Distance Education: Perspectives on What Promotes Positive, Online Learning Experiences	160 (14.55)	E. C. Boling (2012)	10.1016/j.iheduc.2011.11.006
When to Jump In: The Role of the Instructor in Online Discussion Forums	156 (9.75)	Margaret Mazzolini (2007)	10.1016/j.compedu.2005.06.011

*Note.* [1]TC = Total Citations, [2]PY = Publication Year

b.

Title	LC[1] (LC/GC Ratio[2])	First Author (PY[3])	DOI
Factors Influencing Adult Learners' Decision to Drop Out or Persist in Online Learning	31 (10.16)	Ji-Hye Park (2009)	jstor.org/stable/jeductechsoci.12.4.207
The Effect of Blended Learning on Course Persistence and Performance of Adult Learners: A Difference-In-Differences Analysis	10 (15.15)	Nick Deschacht (2015)	10.1016/j.compedu.2015.03.020
Adult Learners' Emotions in Online Learning	9 (9.47)	Michalinos Zembylas (2008)	10.1080/01587910802004852
Predicting Adult Learners' Online Participation: Effects of Altruism, Performance Expectancy, and Social Capital	7 (17.07)	Nguyet A. Diep (2016)	10.1016/j.compedu.2016.06.002
Challenges Faced by Adult Learners in Online Distance Education: A Literature Review	7 (17.07)	Mehmet Kara (2019)	10.5944/openpraxis.11.1.929
Cutting the Distance in Distance Education: Perspectives on What Promotes Positive, Online Learning Experiences	6 (3.75)	E. C. Boling (2012)	10.1016/j.iheduc.2011.11.006
The Quest for Authenticity: A Study of An Online Discussion Forum and the Needs of Adult Learners.	6 (33.33)	Jenny McDougall (2015)	https://files.eric.ed.gov/fulltext/EJ1059160.pdf

Opportunity through Online Learning: Experiences of First-in-Family Students in Online Open-Entry Higher Education	6 (16.22)	Cathy Stone (2016)	https://files.eric.ed.gov/fulltext/EJ1107574.pdf
Sage, Guide or Ghost? The Effect of Instructor Intervention on Student Participation in Online Discussion Forums	5 (2.65)	Margaret Mazzolini (2003)	10.1016/S0360-1315(02)00129-X
Changes in Student Motivation During Online Learning	5 (5.95)	Kyong-Jee Kim (2011)	10.2190/EC.44.1.a

Note. [1]LC = Local Citations, [2]LC/GC Ratio = Local Citation/Global Citation Ratio (%), [3]PY = Publication Year

Figure 7

The Top Ten Most Impactful Documents

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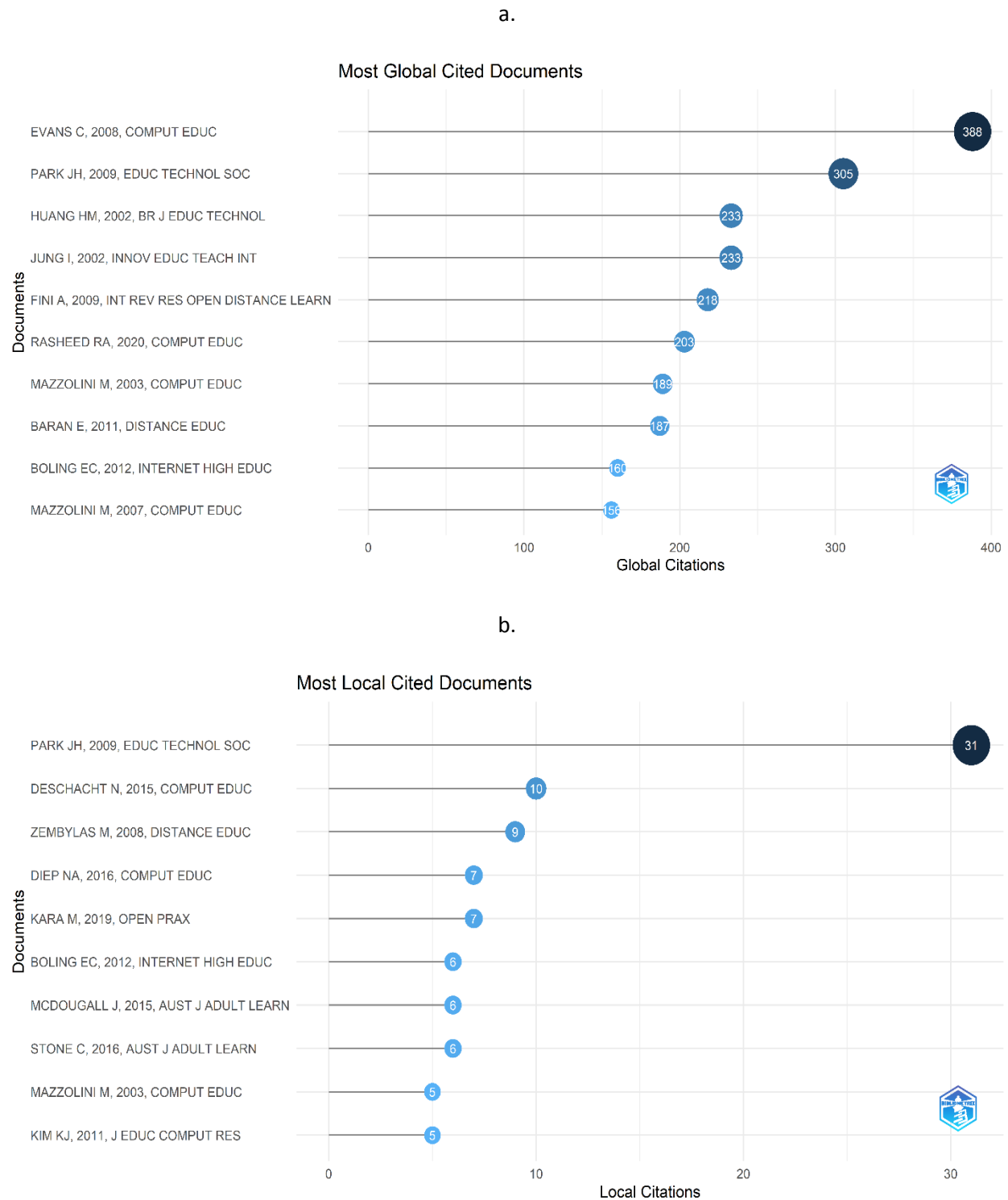
3.6 RQ4 – Network of research collaboration

Figure 8-a shows the network analysis of co-occurrence between authors on adult online learning motivation research. In co-author analysis, social network connections between authors are formed when they jointly publish a paper. Fourteen authors who co-authored in more than four publications were analyzed in terms of their affiliated institutions and countries, and it was found that researchers' collaborations were primarily determined by whether they came from the same institutions. In other words, author-level research collaborations on adult online learning were almost exclusively limited to colleagues working in the same institutions. For example, Chang Zhu, as the biggest hub of author-level research collaboration in this research field, had jointly published related papers with at least 11 of her colleagues from Vrije Universiteit Brussel of Belgium. Similarly, Chin-Chung Tsai had taken the lead in collaboration with at least 3 other colleagues from National Taiwan Normal University in Taiwan.
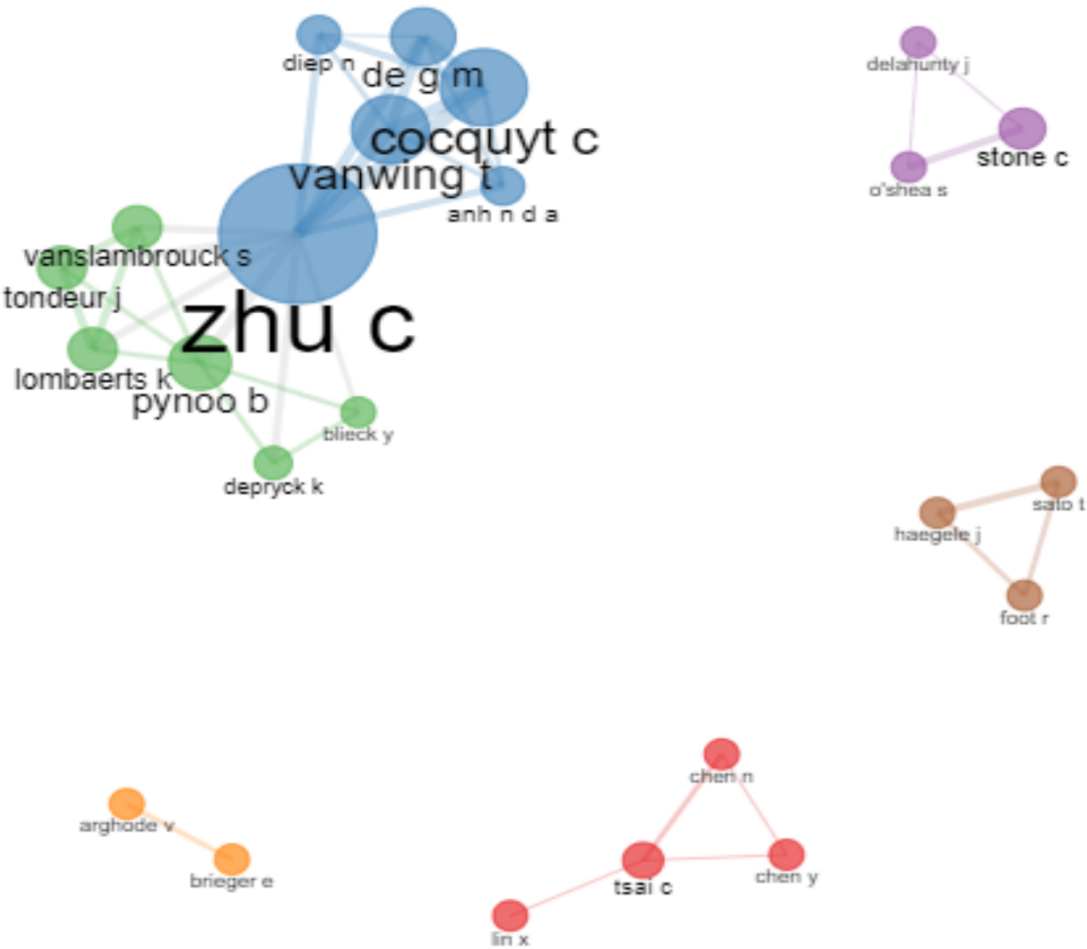
Figure 8-b illustrates the pattern of institutional-level research collaborations on adult online learning motivation. Three regional institution-level collaboration networks were identified as USA institutions (e.g., Penn State University, University of Maryland, Colorado State University), Australian Institutions (e.g., Tasmania University & Wollongong University), and Chinese Institutions (e.g., National Taiwan Normal University in Taiwan, Beijing Normal University, South China Normal University).

Figure 8-c indicates that in terms of international research collaboration on this topic, the USA was the absolute hub of a dominant network covering country-level partnerships from North America, South America, Asia, and Europe. The second largest international collaboration network was formed in Europe with no apparent leading countries.
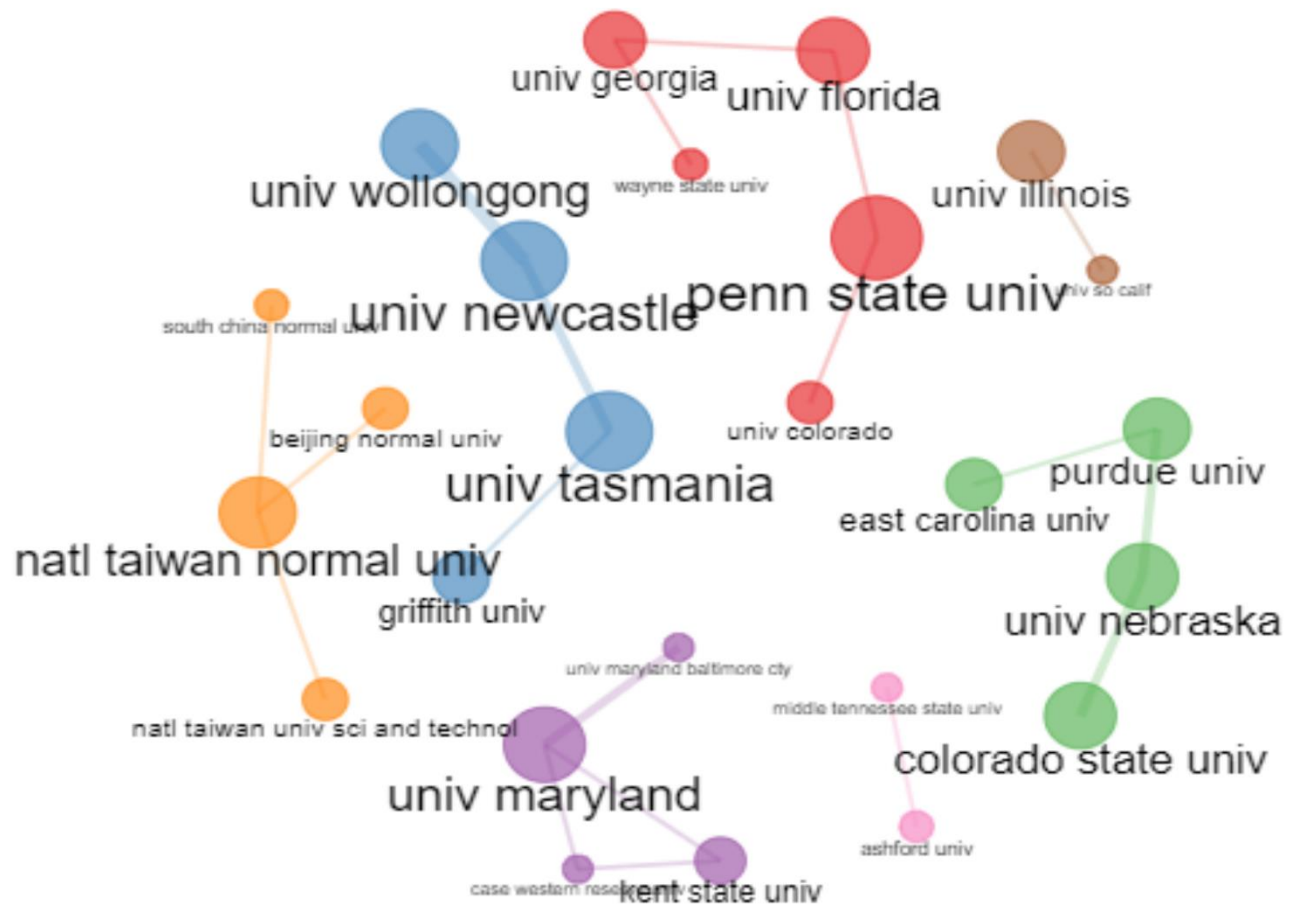
Figure 8-d presents the world map of international collaboration. It was found that the top three collaborating country partnerships were USA & Canada, USA & China, and China & Australia respectively.

Figure 8

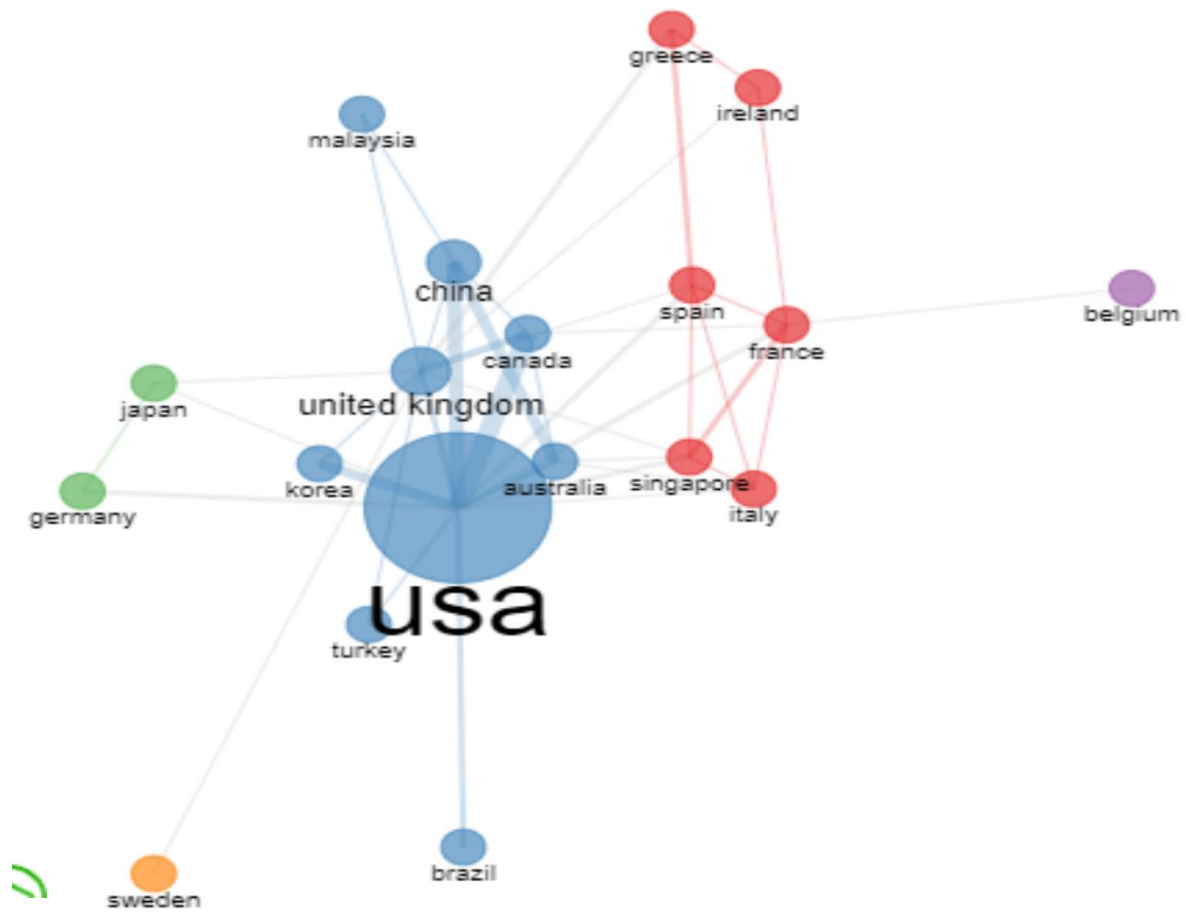*Research Collaboration Networks Among Authors, Institutions, and Countries*

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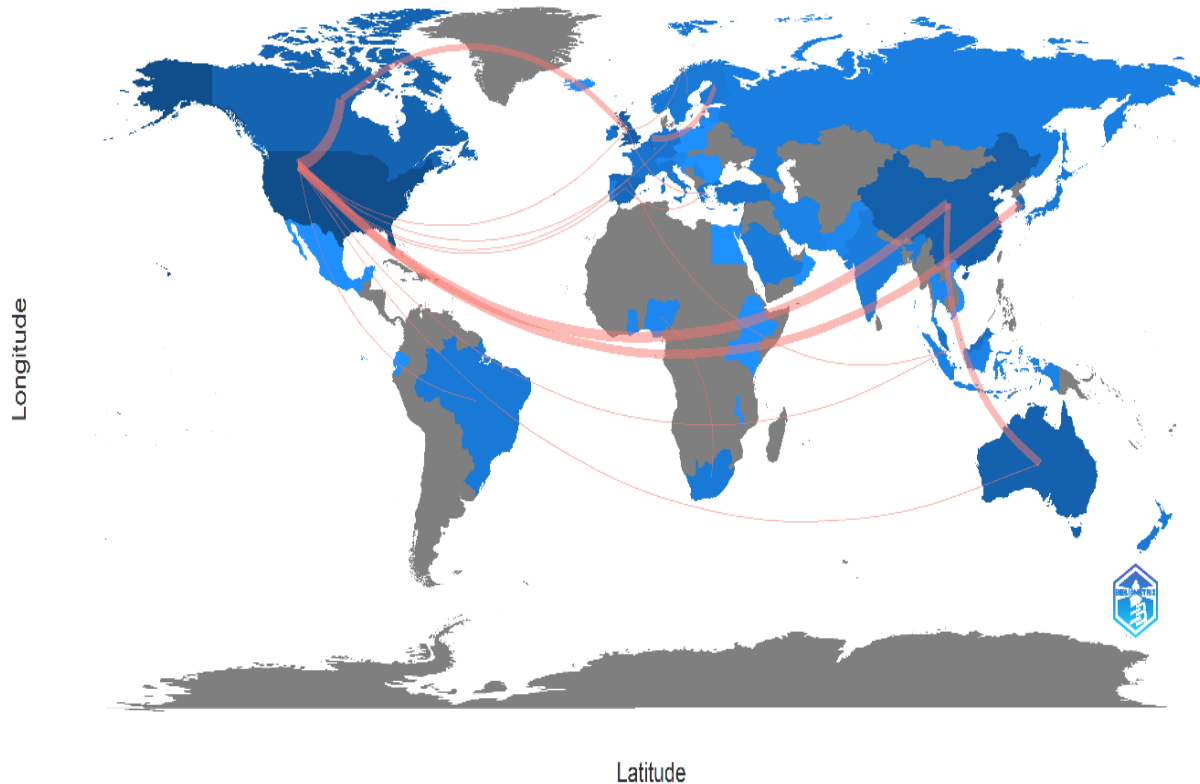51
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Country Collaboration Map

3.7 RQ5 – Trendy topics

Two approaches were considered in the co-occurrence network analysis of keywords to identify

the most relevant and/or *trendy* research concepts/topics/issues during the 2000-2022 period: co-word

analysis using Keyword Plus and using Authors' Keywords. Keywords Plus could be as effective as Author

Keywords in bibliometric analysis to investigate the knowledge structure of a certain research field, but

Keywords Plus terms were more broadly descriptive and thus the Keywords Plus approach might be less

comprehensive in representing an article's content (Abafe et al., 2022; Zhang et al., 2016). Hence in the

current study, both approaches were applied and compared in various types of co-word analyses and

bibliometric mapping to locate and present the better representative sample of the core research

concepts/topics/issues on adult online learning motivation.

As shown in Figure 9-a, excluding the field-defining key terms (e.g., education, online learning, adult learners, motivation, etc.), the most prominent research concepts in this field included *performance*, *achievement*, *perceptions*, *engagement*, *satisfaction*, *strategies*, *self-efficacy*, *knowledge*, *participation*, and *design*.

Figure 9-b illustrates the Author's Keywords cloud on adult online learning motivation from 2000 to 2022. The word cloud provided visually appealing information to show the most frequently co-occurring terms (used by authors to index their papers) with other sources, authors, and articles.

Word Dynamic was generated in Figure 9-c for the analysis of top 10 Keywords Plus terms. It clearly illustrated the growth trends in the past two decades for the prominence of these research concepts/topics in adult online learning motivation literature.

Finally, Figure 9-d displays the trendy topics over time along the 2000-2022 timeline based on Authors' Keywords. The sizes of the blue dots indicated the frequency of occurrences and co-occurrences of these key research terms in the related scholarly literature at a specific time; while the width of the whiskers specified the time frame when a particular research term had been trending.

Again, after excluding those obviously field-defining keywords (e.g., adult learning, online learning, education, etc.), it was noted that (1) by 2016, the top trending research concepts/topics related to adult online learning motivation were *cooperative/collaborative learning*, *teaching/learning strategies*, *interactive learning environments*, *computer-mediated communication*, and *pedagogical issues*; while (2) from 2017 to 2022 (especially after 2019), the new four top trending topics emerged as *COVID-19* (19 publications in 2021), *self-directed learning* (7 articles in 2021), *gamification* (7 articles in 2021), and *transformative learning* (6 publications in 2022).

Figure 9

Summary Results of Co-Occurrence Network Analysis of Keywords

a. Most Frequent Words (Keyword Plus)
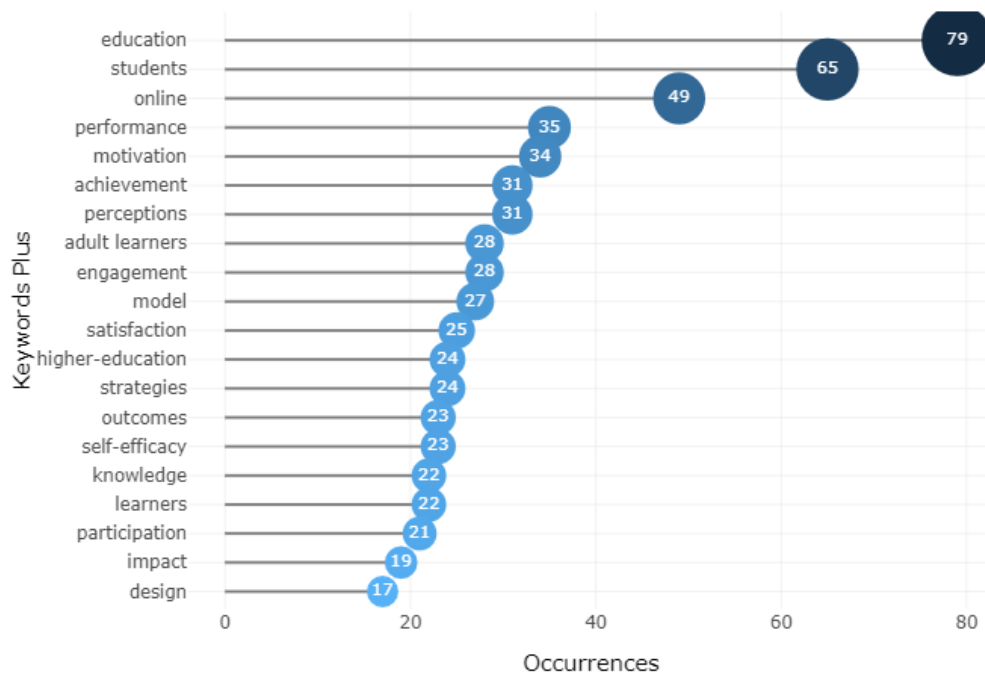
b. Word Cloud (Authors' Keywords)

c. Word Dynamics (Keyword Plus)
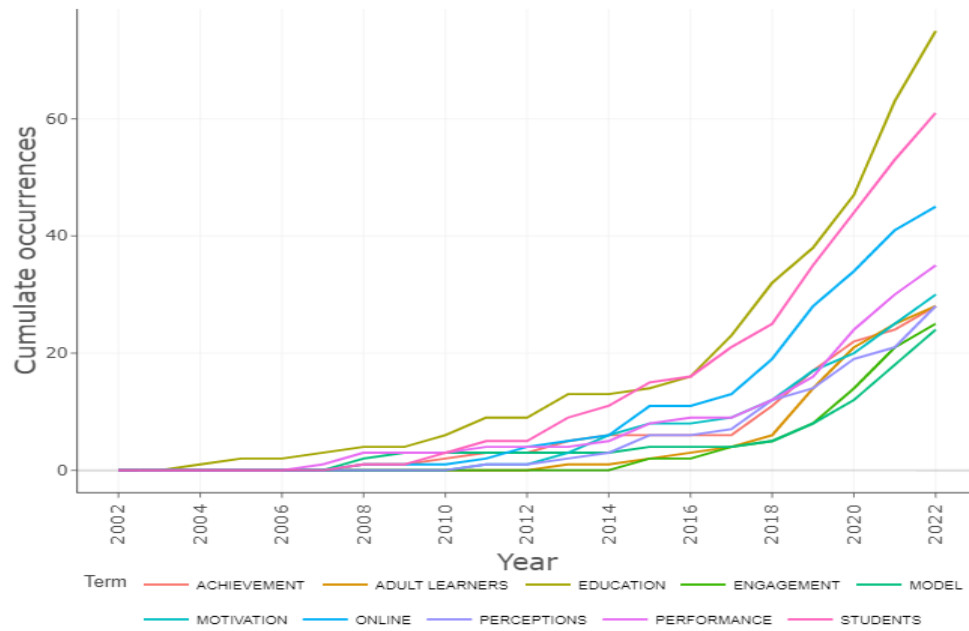
d. Trendy Topics (Authors' Keyword)
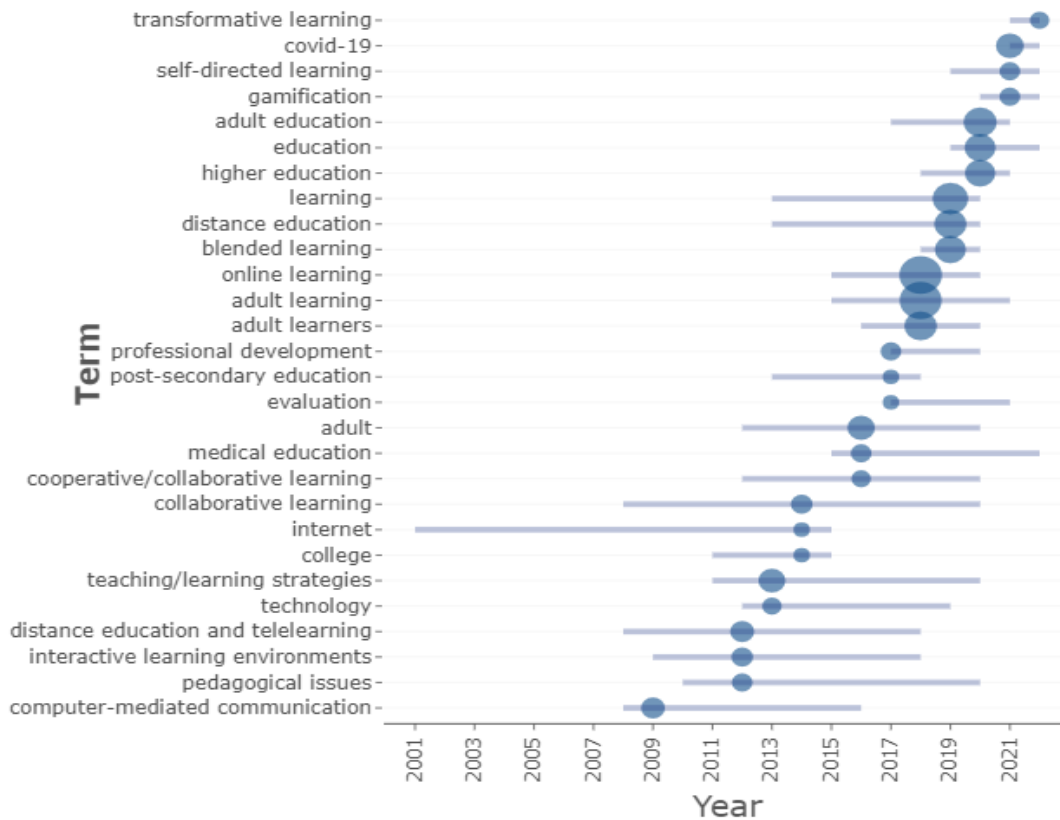
3.8 RQ6 – Thematic centralization & evolution

Both Keywords Plus and Authors' Keywords were used as parameters for thematic mapping and thematic evolution analysis to identify the centralized themes and growth trends in the research field of adult online learning motivation.
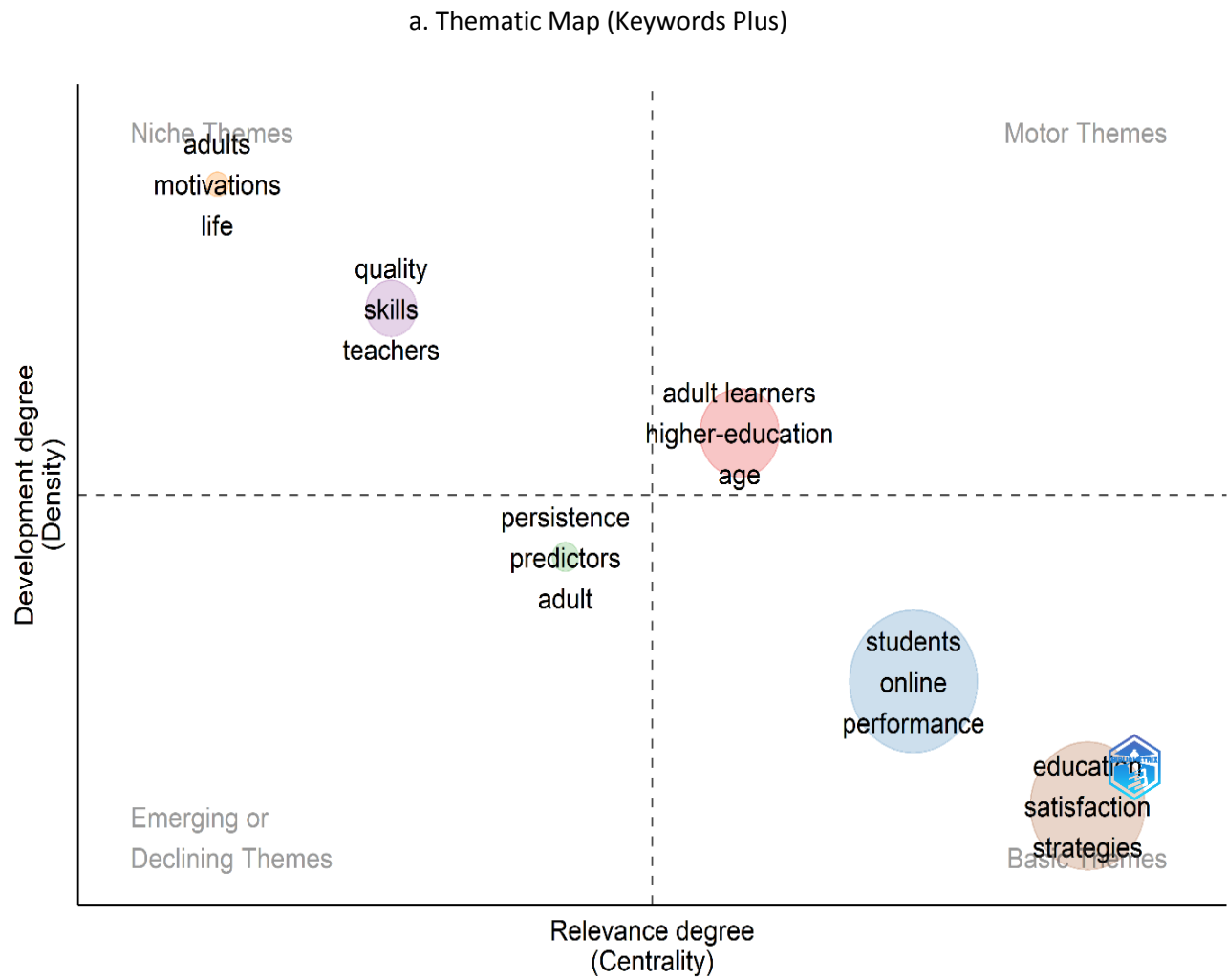
The Keywords-Plus-based thematic map in Figure 10-a shows that the most centralized research themes related to investigating (1) *predictors* of adult learners' *persistence* in online learning, and (2) *age*-related differences among adult learners in the online components of higher education. The future research lines on this topic involved (1) *teachers*' role and preparations in online education, instructional *quality,* and the overall *quality* of online courses, as well as cultivation and/or enhancement of necessary e-learning *skills* to motivate online learners; and (2) adult learners' *life*-work-education balance as motivational factors in their online learning.

In comparison, Figure 10-b presents the central research concepts/themes based on Authors Keywords. The most relevant research themes included *self-directed learning*, and *digital learning literacy*; while the possible future research directions in this field were identified as (1) *self-regulated learning*, online course *design*, and *inclusion* in the online learning environment, and (2) *transformative learning* for adult online learners and *development* of online/blended/hybrid learning programs.
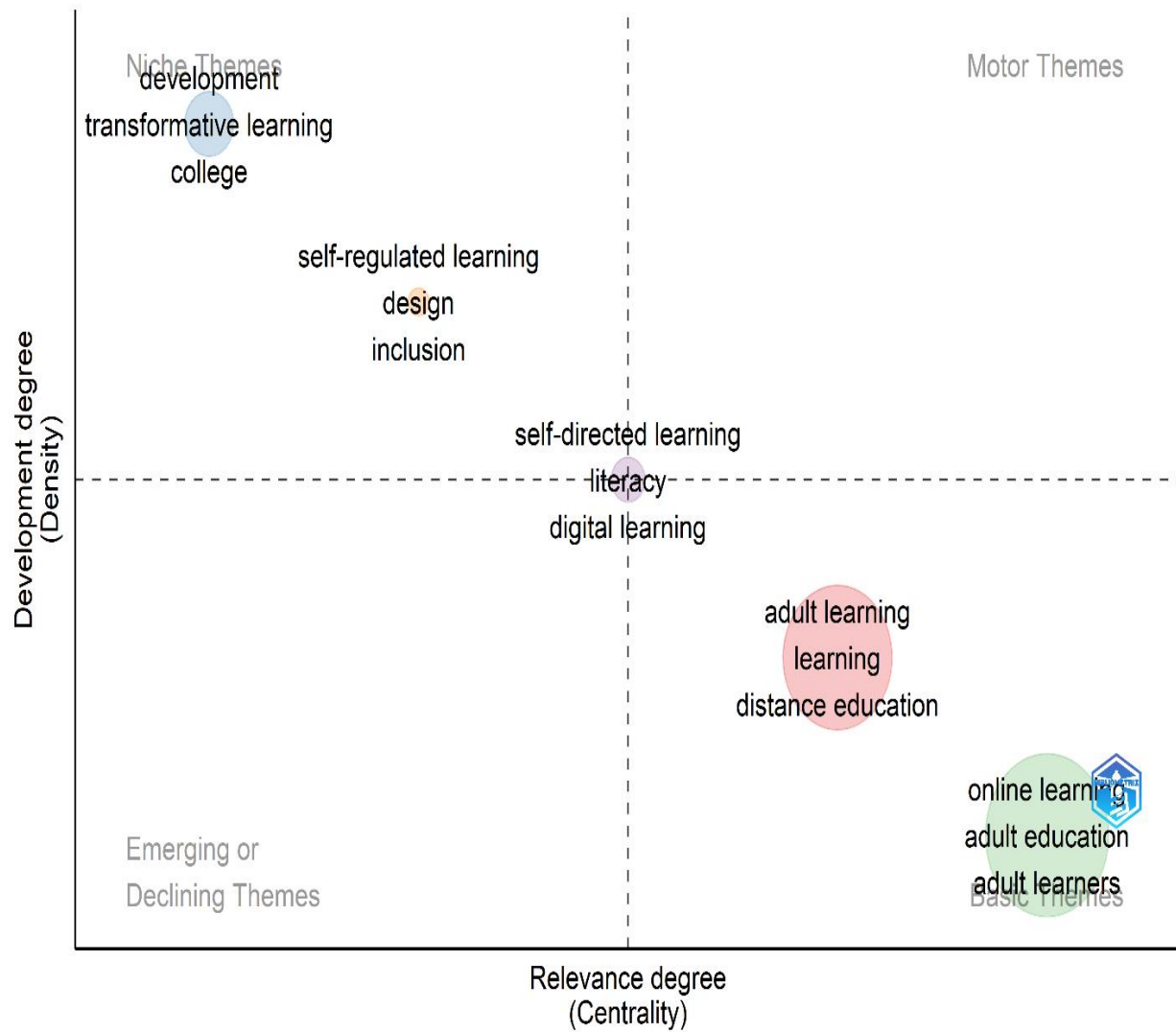
As displayed in Figure 10-c, the thematic evolution over the 2000-2022 timespan was divided into three phases using the Keywords Plus parameter: 2000-2016 (focused on research themes such as *support* for adult online learners and online course *quality*), 2017-2020 (central research themes shifted to *intrinsic motivation* and *self-efficacy* of adult online learners, *heutagogy* and instructional *design*), and 2021-2022 (new research themes emerged as application of new *technologies* in online learning, *management* of online interactions and learning environment, *individual-differences* among adult online learners, *system thinking* of online learning, and reshaping *teachers*' role in online education).
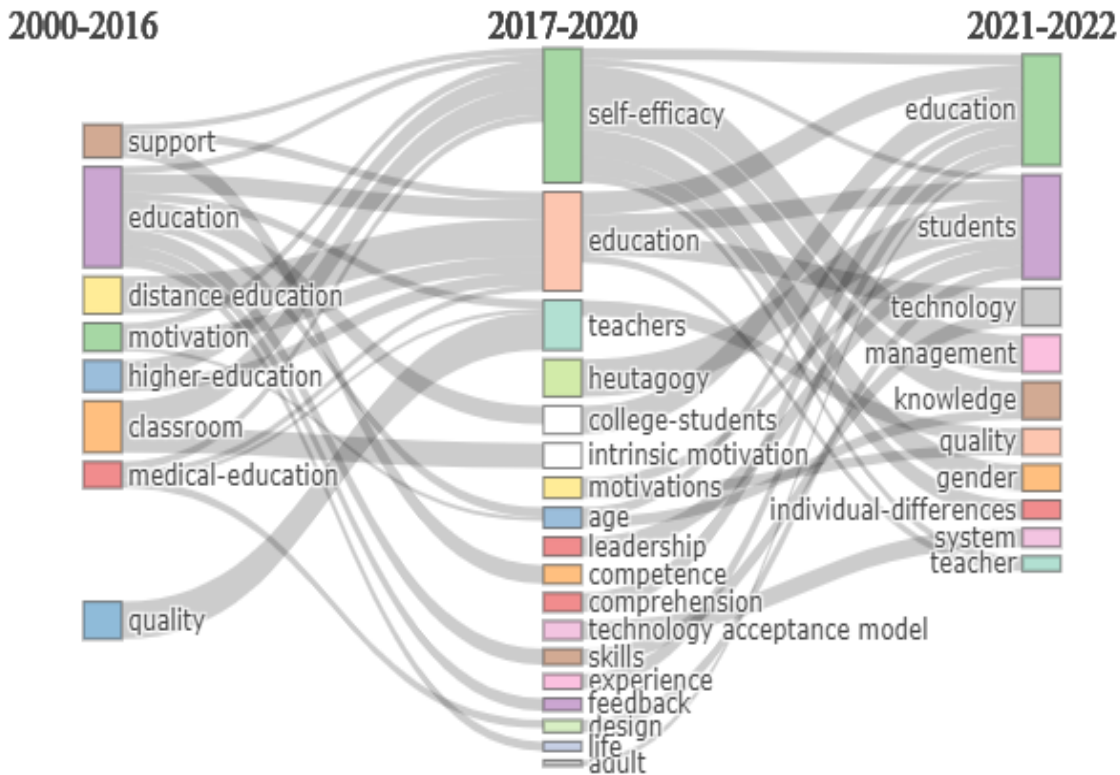
Figure 10

Summary Results of Conceptual Structure Analysis of Themes

a. Thematic Map (Keywords Plus)

b. Thematic Map (Authors' Keywords)

Niche Themes

development

transformative learning

college

self-regulated learning

design

inclusion

self-directed learning

literacy

digital learning

adult learning

learning

distance education

online learning

adult education

adult learners

Emerging or

Declining Themes

Motor Themes

Basic Themes

Development degree
(Density)

Relevance degree
(Centrality)

c. Thematic Evolution (Keywords Plus)

Discussion

Results of this bibliometric study provide a unique and profound view of the changes within adult

online learning motivation and the field's future directions. Although past and recent meta-analyses,

literature reviews, and systematic reviews have improved our knowledge of the field, these primarily

qualitative review methods lack the synergistic and collective insights discovered through bibliometric

analysis. These enhanced insights include performance analysis of research in the field, scientific

mapping and data mining for trend analysis, network analysis to trace research origins and collaborations

in the field, and an analysis of emerging research trends highlighting the future research directions.

4.1 Performance analysis

Based on the bibliometric results, the field of adult online learning motivation is proliferating and

evolving, as demonstrated through numerous statistical discoveries. First, a substantial increase in

research and publication has occurred since 2000, when only two papers were published within the field

compared to 77 documents in 2021 alone. These 77 papers account for 14% of the 541 total papers

published in the field between 2000 and 2021. The field has experienced a 16.45% growth rate since

2000; however, this rate does not accurately portray recent growth. Notably, the number of papers

averaged less than ten papers annually between 2000 and 2010 and between 15 and 25 from 2010 through

2016. Following 2016, the average annual publication rate jumped to 45 in 2017, greater than 60 in 2019,

and 77 in 2021. This growth demonstrates the importance of adult online learning and the desire of

organizations, whether academic or professional, to leverage online learning technology to reach and

teach adult learners as effectively as possible. This growth also potentially informs researchers and

educators that the world is not returning to the pre-COVID ways of operating and reaching adult learners.

Instead, learners and institutions seek to increase access to learning opportunities and do so safely and

cost-effectively. Additionally, this growth demonstrates the recognition that online learning is

challenging, and that motivation is critical to adult learning regardless of the environment or setting.

Technology itself does not and cannot replace the motivation required to learn.

Beyond the entire field's overall performance, this bibliometric study identified 15 journals

responsible for most research representing the core cluster of highly productive journals. Of these 15

journals, *Computers & Education* stands out as the top publication source within the field, significantly

outperforming all other journals in published articles, total citations, *h*-index, *g*-index, and *m*-index. This

indicates that *Computers & Education* is not only highly productive in terms of published research in the

field, but it is also the source most researchers and authors turn to for their research, as seen in the 2,816

total citations or roughly 64 citations per published article. This citation rate is only rivaled by *Internet &*

Higher Education and the *British Journal of Educational Technology* which averaged 58.45 and 52

citations per article, respectively. However, the latter journals each published 11 papers compared to the

44 published in *Computers & Education*. This indicates that researchers and educators interested in this

field should consider turning to *Computers & Education* to learn more about the field as an excellent first

step to begin their exploration.

Finally, the performance analysis identified the United States of America as the most productive

country and Vrije Universiteit Brussel as the most productive institution. Interestingly, the most

productive nation and institution significantly outperformed other countries and institutions in recent

years, beginning in 2016. While most countries' production rates remained stable, the United States'

production increased rapidly in 2016. Similarly, Vrije Universiteit Brussel did not begin publishing

related research until 2016 and has grown rapidly since then.

4.2 Scientific mapping & text mining

An essential capability of bibliometric analysis is the ability to scientifically map and text mine for

prominent themes within a research field. One such finding is the emergence and impact of COVID-19 on

the research field, which accounted for 19 publications in 2021, and influenced trending and emerging

themes in research. The Keywords-Plus thematic map identified the teacher's role and preparations,

instructional and course quality, e-learning skill enhancements, and adults' life-work-educational balance

as trending topics that closely align with the collective experience of educators and students as COVID

spread across the globe. As societies and organizations shut down and mandatory lockdowns were

instituted, educators and organizations began seeking new ways of operating, especially as it became clear

that the pandemic was not a short-term problem with a quick solution. As academic institutions sought to

continue providing education, many realized the challenges of transitioning to online learning. Many

teachers, skilled and experienced in in-person teaching, lacked the experience to effectively teach in an

online environment requiring teachers to rethink their roles and develop new methods to prepare lessons.

With many courses designed and optimized for in-person attendance, course and instructional quality

were negatively impacted, further degraded by many adult learners lacking the necessary e-learning skills

to adapt and complete online courses. Remarkably, researchers in the adult online learning field quickly

recognized this and began researching and designing interventions to address these challenges resulting

from COVID-19.

In addition to COVID-19, the scientific mapping identified central themes and trendy topics other

than COVID within the research. These significant themes include teaching and learning strategies, self-

regulated/directed learning, computer-supported collaborative learning, social media/communities of

practice, dropout/retention, creativity/critical thinking, and challenges/barriers to adult online learning.

The trendy topics included Transformative Learning (TL), Self-Directed Learning (SDL), and

gamification. These trendy topics reflect and address the field's unique needs. As uncovered through the

literature review, the field suffers from an overall lack of empirical evidence, with what research does

exist often providing conflicting results. Focusing on TL or SDL may help the field evolve while building

an updated theoretical foundation for future research in the field.

4.3 Network analysis

The network analysis uncovered concerning information regarding research in the field and areas

to strengthen the collective body of work. As previously mentioned, the research literature lacks

international collaboration and partnerships between institutions. Additionally, the network analysis

identified that individual authors tend to only partner with colleagues at the same institution, the United

States produced significantly more papers than other countries, and most international collaboration

occurred between the United States, China, and Australia, each of which is also a regional center for

research in the field. Notably, the United States accounted for 37.5% of the total publications, with the

next closest producer being China, accounting for 8.1% of the total publications. Mirroring this volume,

researchers from the United States are collectively the most cited within the field.

The nature of the various network analyses indicates that the field is still quite siloed. Most

researchers work with those closest to them geographically and institutionally, which could reflect similar

cultures, beliefs, and perspectives on the subject. The limited international and institutional collaboration

potentially limits the generalizability of many findings. Adult learners are a diverse group reflecting

various cultures, ethnicities, beliefs, and values in addition to multiple environments and levels of access

to learning technologies. Based on the results, there is an urgent need to increase international,

institutional, and author collaboration strengthening the collective body of knowledge in this field.

4.4 Future research direction in the field

This bibliometric study uncovered two emerging research directions within the adult online

learning motivation field: Self-Directed/Self-Regulated Learning & Transformative Learning, and

innovative approaches such as gamification. SDL and TL may eventually prove immensely valuable in

understanding what influences an adult learner's motivation in an online setting. Both recognize the value

of an adult learner's prior experiences and prioritize the adult learner's ability to take charge of their

learning, increasing learner motivation. For example, Willems et al. (2021) suggested that SDL is a

critical component in adult online education as online platforms increase autonomy and remove external

regulators customarily found in traditional classrooms, thus requiring online learners to be self-directed

and internally motivated. Schroeder et al. (2020) explored online resistance groups from the perspective

of TL and found that the participants gained a deeper understanding, increased their ability to discern

information online, gained confidence, and saw themselves as connected and capable. Beyond findings

supporting this emerging direction in research, a focus on SDL and TL represents an opportunity to

develop the theoretical foundations for the field.

A second future direction for research is a continued exploration of innovative approaches such as gamification, introducing and using video game elements in non-gaming settings such as online learning to increase engagement. Numerous newer studies captured within the bibliometric sample provide promising results for continuing this line of research. Xu et al. (2021) performed a systematic review and found that gamification improves intrinsic motivation through various gaming concepts such as leaderboards and badges and that experimental gamification studies show correlations with learning behaviors. Additionally, Kim and Castelli (2021) found similar results in their meta-analysis covering gamification and behavioral changes in educational settings, including their crucial finding that short-term gamification-based interventions promote behavior changes and improve learning outcomes. The collective findings regarding gamification are promising in the current and future adult online learning environments.

Conclusions

As the first bibliometric analysis ever conducted on adult online learning motivation, this study systematically evaluated the relevant research literature from 2000 to 2022, and identified key players, research trends and themes, and research gaps. First, this study emphasized the impacts of COVID-19 on the collective experiences of online educators and adult learners. Furthermore, network analysis showed inadequate cross-institutional and/or international research collaborations in this field. Most importantly, to address the theory-practice mismatch in the current research literature, a grounded meta-analysis approach using bibliometric techniques in this study laid the foundation for the development of a new empirically based, multi-facet theoretical framework that could better guide the relevant research and practices in future. Finally, the study highlighted two promising future research directions in the field: Self-Directed/Self-Regulated Learning & Transformative Learning, and innovative use of educational technologies, such as gamification.

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Highlights:

- The first bibliometric analysis ever conducted on adult online learning motivation
- Highlighted COVID-19 impacts on adult online learning motivation
- Inadequate cross-institutional and/or international research collaborations in the field
- Self-Directed/Self-Regulated Learning & Transformative Learning
- Innovative integration of educational technologies (e.g., gamification)