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Applied Research in Quality of Life: A Computational Literature Review

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Abstract

As quality of life (QoL) is a highly interdisciplinary topic with a multitude of related research areas, it is beneficial to avail researchers of an overview of the different streams explored in the field. Furthermore, knowledge of prominent sub-domains helps researchers identify links and overlaps between QoL and their fields of interest. To meet these needs, a text-mining-based computational literature review (CLR) of the journal of *Applied Research in Quality of Life* (ARQOL) was conducted using a machine learning process, latent Dirichlet allocation (LDA), in combination with selection criteria for the decision on the number of topics. The outcome provides the reader with a list of the twelve most heavily discussed topics: 1) consumption & materialism, 2) character strength, 3) spirituality, religiousness & personal beliefs, 4) inequality, 5) leisure & tourism, 6) health related QoL (HRQoL) I, 7) quality of working life (QWL), 8) childhood & adolescence, 9) disparity & development, 10) disorder, 11) community issues, and 12) health related QoL (HRQoL) II. In addition, authors, titles, and publication dates are listed for the top-5-ranked papers that most typify these topics. Subsequent content summaries of these papers reveal more detailed information, such as measurement constructs and theories.

Keywords Applied Research in Quality of Life (ARQOL) · Computational literature review (CLR) · Scientometrics · Text mining · Machine learning · Latent Dirichlet allocation (LDA)

Introduction

One way to stress a heavily discussed subtopic within a pre-defined research field is through Systematic Literature Reviews (SLRs) (Petticrew & Roberts, 2006). Authors of such papers first frame the thematic scope and subsequently provide a structure for

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this pre-defined scope. Hence, SLRs represent an important source of insight into a delimited research area. Such review papers have also been elaborated on QoL subtopics: for an SLR on QoL research in medicine and health sciences, see Haraldstad et al. (2019), on multimorbidity, see Makovski et al. (2019). Several more review papers analyzing subtopics within the broad thematic field of QoL (Bak-Klimek et al., 2015; Bhatt et al., 2012; Charlemagne-Badal et al., 2015; Galloway, 2006; Lavy, 2020; McIntyre et al., 2014; Merianos et al., 2015, 2016; Mogos et al., 2013; Paloma et al., 2020; Qi et al., 2020; Roepke et al., 2014; Sirgy & Lee, 2018) have been published in ARQOL, the official journal of the ISQOLS (International Society for Quality-of-Life Studies 2020), but no reviews are available at its meta-level. Since at least the publication of the European Commission on the Measurement of Economic Performance and Social Progress (Stiglitz et al., 2009) confronting traditional approaches of economists with human wellbeing, efficient communication of a structured list of the most prominent drivers of QoL discussed in academic literature to a broader audience is a must. To address this omission, the research goal of the paper at hand lies in the categorization of ARQOL topics.

The 'science of science' (Fortunato et al., 2018), called 'scientometrics' (Leydesdorff & Milojevic, 2015), helps to summarize scientific outcomes and is therefore appropriate for this task. Scientometrics partly overlaps with bibliometrics and informetrics (Hood & Wilson, 2001) and brings its strengths into play when it comes to cross-sectional and longitudinal information extraction (IE) applied to big data. Scientometric ideas combined with probabilistic topic detection algorithms (Blei et al., 2003) offer several advantages compared with SLRs based on manual content analysis. First, the massive workload necessary to screen a single journal (e.g. ARQOL), a thematic field with an intra-disciplinary perspective (e.g. QoL), or an inter-disciplinary perspective (e.g. social sciences), is handed over to a computer-assisted process (Jennex, 2015). Second, text-mining-based algorithms reveal topics in an objective way compared with manual approaches lacking reproducibility due to reasons of subjectivity. Consequently, ARQOL topics are herein categorized by means of a computational literature review (CLR; CLR examples: Mortenson & Vidgen, 2016; Knuc et al., 2018; Hindle et al., 2020).

The remainder of this paper is divided into the following sections: The theoretical framework outlines challenges in the creation of a thematic structure for QoL subtopics and screens SLRs published in ARQOL. The methodology section discusses an alternative solution to the more common SLRs by outlining the steps involved in performing CLRs, including data preparation, weighting, and topic modeling. The results section presents descriptive statistics on ARQOL and its inherent topical foci based on the term clusters revealed by the machine learning algorithm, LDA. The five papers that best typify each identified topic are listed. The discussion section compares the term clusters with the content of these papers for validity purposes. The paper closes with limitations and further research directions.

Theoretical Framework

Up to January 14th 2021, 893 papers had been published in ARQOL since the first edition opened with a personal note by Michalos (2006). The journal's aims and scope are communicated as follows:

> "The aim of this journal is to publish conceptual, methodological and empirical papers dealing with quality-of-life studies in the applied areas of the natural and social sciences […] crafted from interdisciplinary, inter-professional and international perspectives […] guide decision making in a variety of professions, industries, nonprofit, and government sectors, including healthcare, travel and tourism, marketing, corporate management, community planning, social work, public administration, and human resource management […] help decision makers apply performance measures and outcome assessment techniques based on concepts such as well-being, human satisfaction, human development, happiness, wellness and quality-of-life. The editorial review board is divided into specific sections indicating the broad scope of practice covered by the journal. […]" (Applied Research in Quality of Life 2020).

The whole statement and especially the very last comment show that the aims and scope of ARQOL are broadly defined as QoL overlaps with a wide range of research fields. Even though some narrower subtopics are mentioned, a list of topics following the mutually-exclusive-and-collectively-exhaustive (MECE) principle (Lee & Chen, 2018) is hardly possible. A mutually exclusive list of topics enabling each paper to be assigned to a single topic is not possible as papers are frequently built upon a bundle of different topics. A collectively exhaustive list is similarly infeasible, as the range of topics is continuously broadening with the emergence of new research fields influencing QoL research. Examples for such new streams are studies tackling genetic influences on happiness (Nes & Røysamb, 2017), discussions taking an evolutionary perspective (Wilson, 2016), or analyses following a neurobiological perspective (Kringelbach & Berridge, 2017). In sum, not all topics covered by ARQOL can be explicitly stated in the aims and scope, yet researchers could nevertheless benefit from a quick and accessible overview of the most heavily discussed topics.

One type of paper summarizing widely debated topics from a broader perspective are SLRs (Petticrew & Roberts, 2006; Snyder, 2019). To promote high quality SLRs, best practice guidelines have been proposed for wellbeing research (Hennessy & Johnson, 2019; White & Schmidt, 2005). The approach common to all SLRs involves initially collecting papers connected with a delimited topic, before summarizing those publications across the topic of interest. Most ARQOL papers classified as SLRs on the journal's website or identified as such by crawling ARQOL's titles for the search term "review" conducted a systematic bibliographic computerized online search using pre-defined keywords handed over to various databases (chronologically ordered in Table 1).

Galloway (2006) conducted a systematic mixed literature search (electronically and manually) of English language publications from 1995 to 2006 to study the

Table 1 SLRs published in ARQOL

Authors (Year)	Title	Source (technique)	Search terms (+ combinations)
Galloway (2006)	Cultural participation and individual quality of life: A review of research findings	BIDS, MEDLINE, PsycINFO + key organization & research center websites, bibliography reviews and the web plus manual journal searches, posts to lists, experts	Quality of life, culture, arts
Bhatt et al. (2012)	Health outcome measures for diabetes mellitus: A review	MeSH term search in PubMed using MEDLINE + PROQOLID	Quality of life, diabetes mellitus, questionnaire instrument, health outcome measures, validity, reliability, responsiveness
Mogos et al. (2013)	A systematic review of quality of life measures in pregnant and postpartum mothers	CINAHL, COCHRANE, EMBASE, PsycINFO, PubMed, MEDLINE	Quality of life, health-related quality of life, pregnancy, postpartum, measurement
McIntyre et al. (2014)	Quality of life and bladder management post spinal cord injury: A systematic review	MEDLINE, CHINAHL, EMBASE, PsycINFO	Spinal cord injuries, tetraplegia, paraplegia, neurogenic, bladder, urology, QOL
Roepke et al. (2014)	Meaning and health: A systematic review	PsycINFO and PubMed using PRISMA	Health, physical health, aging, meaning, meaning in life, life meaning, purpose in life, life purpose, sense of meaning, sense of purpose, personal meaning, benefit finding, posttraumatic growth, stress related growth, physical health
Bak-Klimek et al. (2015)	The determinants of well-being among international economic immigrants: A systematic literature review and meta-analysis	AMED, CINAHL, MEDLINE, PsycINFO, ASSIA, ZETOX, PubMed, Psychology and Behavioral Sciences Collection, Sociological abstracts	Immigrant* OR migrant* OR emigrant* AND well-being OR wellbeing OR happiness OR satisfaction
Charlemagne-Badal et al. (2015)	Conceptual domains included in wellbeing and life satisfaction instruments: A review	HaPI	Wellness, wellbeing, life satisfaction, personal satisfaction
Merianos et al. (2015)	Hospital, school, and community-based strategies to enhance the quality of life of youth with chronic illnesses	CINAHL, Academic Search Premier, SocINDEX, MEDLINE, Education Research Complete	Chronic illness, youth, quality of life, intervention

Table 1 (continued)

Authors (Year)	Title	Source (technique)	Search terms (+ combinations)
Merianos et al. (2016)	Mentoring and peer-led interventions to improve quality of life outcomes among adolescents with chronic illnesses	MEDLINe, PsycINFO, CINAHL	Psychosocial interventions, community-based interventions, social support, quality of life, chronic illness, youth, adolescents
Sirgy and Lee (2018)	Work-life balance: An integrative review		-
Lavy (2020)		Google Scholar, Scopus, reviews' reference lists of reviews and the VIA Institute on Character using PRISMA, CONSORT	Character strengths, education, teacher, teaching, school, student, intervention, trial, exercise
Paloma et al. (2020)	Determinants of life satisfaction of economic migrants coming from developing countries to countries with very high human development: A systematic review	PubMed, PsycINFO, Scopus, Web of Science	Migra, life satisfaction, satisfacción con la vida
Qi et al. (2020)	Trends of positive youth development publications (1995–2020): A scientometric review	Web of Science (SCI Expanded, SSCI, A & HCI, CPCI-S, CPCI-SSH, and ESCI) using CiteSpace	Positive-youth-development

effect of cultural participation on individual QoL. Bhatt et al. (2012) systematically collected questionnaires for the measurement of diabetes mellitus health outcomes and compared psychometric properties of these instruments. Mogos et al. (2013) studied QoL measurement scales in pregnant and postpartum mothers. McIntyre et al. (2014) compared different neurogenic bladder management techniques after spinal cord injuries (SCI) among extracted articles and came to the conclusion that not only physiological, safety, and practical considerations but also urologic-specific QoL outcome measures must be included in determining the "gold standard". Roepke et al. (2014) used a SLR to investigate the term 'meaning' and to examine its relationship with physical health. Bak-Klimek et al. (2015) systematically reviewed the determinants of well-being among international immigrants. Charlemagne-Badal et al. (2015) identified the absence of instruments suitable for the measurement of wellbeing and life satisfaction (LS) which would be highly beneficial for health research as well as professionals dealing with clinical applications. Their measurement instrument revealed the most often included domains across the following concepts: cognitive, economic, emotional, physical and social health, environmental, health behavior, health care, intellectual pursuits, leisure, life satisfaction, non-leisure activities, sleep, spirituality/meaning, and vitality. Merianos et al. (2015) collected different studies to examine hospital-based, school-based, and community-based strategies health professionals use to improve the QoL of youth with chronic illnesses. Another comprehensive review conducted by Merianos et al. (2016) identified mentoring/coaching and peer-led interventions in community-based programs to improve the QoL outcomes for adolescents. Sirgy and Lee (2018) portrayed an integrative concept of work-life balance. Lavy (2020) analyzed the mechanisms and practices necessary to foster strength of character in twenty-first-century schools and developed an integrative model of an optimal school system. Paloma et al. (2020) studied migrants from developing countries settling in countries with very high human development levels to identify main determinants of LS. Qi et al. (2020) studied the development of publications discussing positive youth development (PYD) between 1995 and 2020 focusing predominantly on bibliometric information.

Each of these papers provides a thorough exploration of research on a delimited topic, as is its respective purpose. The time effort invested through SLRs in the identification of the most valuable research by manually screening the collected papers over the preceding decades is of great use to other researchers – particularly those connected only tangentially to the topic – as it economizes their own literature search and encourages empirical studies instead. However, manual content analysis cannot be conducted continuously due to time constraints, meaning that SLRs may quickly become outdated in fast-changing research fields, and results might differ between different authors because of the innate subjectivity of the process (Mortenson & Vidgen, 2016): the latter also raises validity questions of longitudinal comparisons between SLRs on the same topic (i.e. updates).

Considered together, these reviews begin to charter the broad field of QoL research, yet the result is just a piecemeal and overlapping collage of topics that fails to systematically map the broad scope covered by ARQOL at the meta-level. On this

account, computerized topic modeling solutions have been developed to produce objective reproducible results that supplement and/or replace manual content analysis to a certain extent (Suominen & Toivanen, 2015). As the purpose of this study is to provide a holistic overview of the thematic scope of ARQOL, accompanied by their most representative papers, the methodology section outlines how to embed computer-assisted techniques for the creation of CLRs.

Methodology

Data Preparation and Term Selection

All 893 papers published in ARQOL between May 2006 and January 14th 2021 were converted from.pdf to.txt and imported into R (release 4.0.3), an open source software environment for statistical computing and graphics (R Core Team, 2021). Subsequently, the following data preparation steps were conducted:

Lemmatization was used to determine the root form of inflected terms (e.g. organs → organ; organizations → organization) (Rinker, 2018). Lemmatization was preferred to the more frequently used stemming procedure: Porter's stemming algorithm (Porter, 1980). Stemming cuts prefixes and suffixes from the inflected terms, but this raises the problem of terms with different meanings being reduced to the same root (e.g. organization → organ; organs → organ). Consequently, lemmatization was preferred (Gupta & Jivani, 2018). AE and BE distinctions were ignored.

A list of stopwords (e.g., 'and', 'or', 'if') (Benoit et al., 2019), white spaces, terms ≤ 2 characters, as well as numerical and other non-alphanumeric characters were removed (Feinerer & Hornik, 2020; Feinerer et al., 2008).

Furthermore, punctuation was removed, as part-of-speech tagging (POS) (Kumawat & Jain, 2015) used to label full sentence terms by their word class categories (e.g., noun, verb) will not wash out the word-sense disambiguation for those parts of a text that do not consist of full sentences (e.g., the term 'park' has several meanings: 'park a car', or 'go for a walk in a park'). Hence, tokenization was used to transform the sentence structure to a bag-of-words (BoW) model (Sebastiani, 2001) and the difference between upper- and lower-case letters was ignored by changing all capital letters to lower-case letters. This guarantees that terms starting with a capital letter, e.g. at the beginning of a sentence, are treated as having identical meanings as the same terms starting with a small letter within a sentence.

Subsequently, terms were deleted upon their 'term frequency – inverse document frequency' (*tf_idf*) weight (Spärck, 1972). It is the most widely used global term-weighting procedure for text-based analysis (Breitinger et al., 2015).

$$tf\_idf_{ji} = \frac{f_{ji}}{\sum_{i=1}^{n} f_{ji}} \times \log\left(\frac{|D|}{\left|\left\{d_j | t_i \in d_j, d_j \in D\right\}\right|}\right)$$

f_{ji} is the frequency of a specific term in a document. $\sum_{i=1}^{n} f_{ji}$ is the total number of terms in a document. $|D|$ is the number of documents, here 893 ARQOL papers, and

$\left|\left\{d_j | t_i \in d_j, d_j \in D\right\}\right|$ is the number of documents containing the specific term. tf_idf puts more weight on terms contained in relatively few documents and stresses their discriminative power. Deletion of terms with tf_idf-weights below the median of the tf_idf-distribution of all terms has been recommended (Grün & Hornik, 2011) and was applied to the whole corpus to sort out irrelevant terms.

Topic Modeling

After data preparation and term selection, one of the most often used generative machine learning techniques for topic modeling was used to retrieve the strongest ARQOL topics as well as their best matching papers, namely LDA (Blei et al., 2003). In contrast to correlated topic models (CTM) (Blei & Lafferty, 2007), topics are assumed to be uncorrelated in LDA. It determines topics under the following probabilistic logic: First, each document (here ARQOL papers) is a multinomial mixture of several different topics – the topic per document model. The terms of each document should be allocated to as few topics as possible. Second, each topic is a multinomial mixture of several different terms – the term per topic model. As few terms as possible should be allocated to each topic with the highest possible probabilities. Both are modeled by Dirichlet distributions (Blei et al., 2003). Assuming that it is possible to sketch a paper with just a small number of topics and to sketch a topic with just a small number of terms, the most discriminative topics from the ARQOL corpus are determined and the most typical ARQOL papers that fit a certain topic are discovered.

The model was estimated using Gibbs sampling as variational expectation–maximization (VEM) is computationally more demanding in terms of memory, as well as the fact that Gibbs sampling allows for application to large corpora (Grün & Hornik, 2011). In addition, LDA is preferred against widely used techniques like latent semantic indexing (LSI) or non-negative matrix factorization (NMF) (Rahman et al., 2020).

Based on the assumption that single papers may cover multiple topics at the same time, overlapping term clusters are requested. Compared with hierarchical cluster analysis (HCA) that produces disjoint term clusters (topics) and does not allow for overlaps between topics, LDA is not bound by this restriction. Thus, each term can be allocated with different probabilities to multiple topics and not just one single topic, as with HCA. Summarized, joint term clusters derived from LDA are preferred against disjoint ones so that each paper can capture more than one single topic.

Finally, the number of topics is not known a priori. If a small number of topics is chosen, LDA reveals broader topics at higher latent levels. In contrast, the selection of a large number of topics results in narrower topics at lower latent levels. The specification of the number of topics can be statistically explored (Murzintcev, 2020). Two minimization heuristics (Arun et al., 2010; Cao et al., 2009) and two maximization heuristics (Deveaud et al., 2014; Griffiths & Steyvers, 2004) were estimated to ease the decision on the number of topics (Fig. 1).
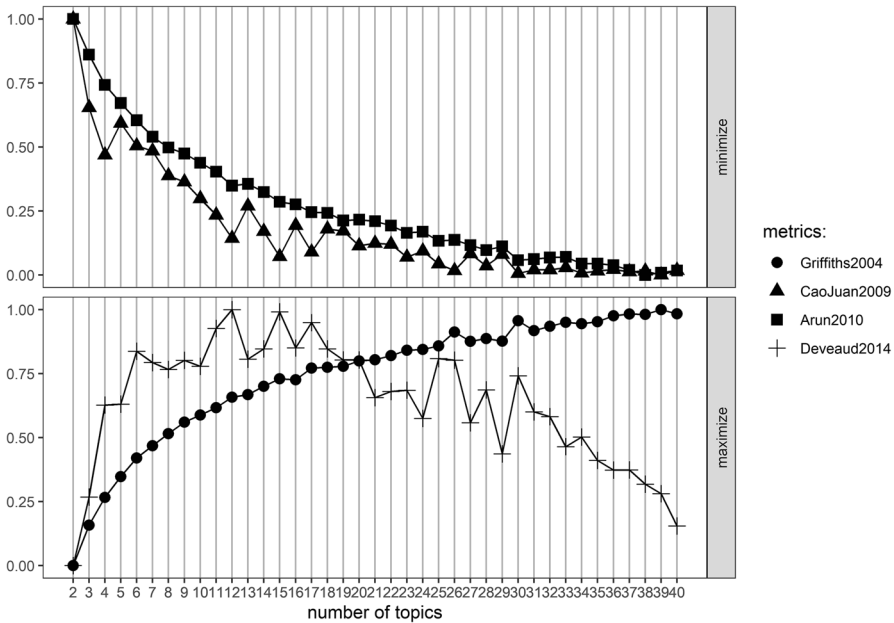
Fig. 1 Number of topics

No outstanding value nor striking inflection point (i.e. remarkable differences between neighboring solutions) were detectable for Griffiths and Steyvers's (2004) criterion, except from a constant improvement of fit towards higher-dimensional solutions – underlining the broad variety of QoL topics – and a state of indifference at around 40 topics. Hence this criterion did not reveal any further insights, but the other three did. The highest value for Deveaud et al.'s (2014) criterion maximizing divergence between all LDA topic pairs was found for 12 topics. An in-depth evaluation of its path along the number of topics indicated increasing fit up to 6 topics, almost indifference between 6 and 10 topics, another increase in fit up to 12 topics, but much worse fit for 13 topics with varying dissimilarity values for higher-dimensional solutions. The same noticeable differentiation between 12 and 13 topics was observed by Cao et al.'s (2009) minimization criterion, minimizing the average cosine distance between all topic pairs (small values signalize independent topics). Likewise, Arun et al.'s (2010) minimization criterion shows a monotonic decrease in similarity up to 12 topics but worse fit for 13 topics. Therefore, the 12 topic solution is presented in the results section.

Results

Descriptive Statistics

ARQOL was founded in 2006. Between May 2006 (first issue) and January 14th 2021, 893 articles were published in 15 volumes (61 issues) and as online first

publications. These include original research and review papers, book reviews, reports, editorial notes, brief communications, corrections, and errata. The latter do not distort the topic formation as it is solely based on Dirichlet-distributed topic-term distributions ignoring the type of paper. The average number of terms per document after removal of stopwords, punctuation, numbers, non-alphanumeric characters, and terms ≤ 2 characters was 3,970 terms (median: 4,208). After deletion of the least discriminative terms according to their *tf_idf* weight, on average 846.6 terms (median: 854) per document were handed over to the LDA machine learning algorithm.

Exploratory Statistics – Term Clusters

Figure 2 illustrates the twelve most fundamental topics discussed in ARQOL revealed by LDA. The content-wise summation of terms within each cluster is as follows: 1) Consumption & materialism, 2) Character strength, 3) Spirituality, religiousness & personal beliefs, 4) Inequality, 5) Leisure & tourism, 6) Health-related QoL (HRQoL) I, 7) Quality of working life (QWL), 8) Childhood & adolescence, 9) Disparity & development, 10) Disorder, 11) Community issues, and 12) Health-related QoL (HRQoL) II.

Exploratory Statistics – Paper Clusters

Table 2 lists the five papers most representative of each topic. They were determined by calculating the estimated proportion of terms within a specific paper that are built upon the terms of just one specific topic, the so called per-topic per-document probabilities or gamma values, γ, listed in column three. For each topic, the top-5-ranked papers were selected based on the highest proportion of explained terms. A manual assessment of these papers found all to be thematically consistent with the topic to which they were computationally assigned.

Discussion

SLRs are valuable sources of information as they give detailed overview on a specific research topic in a condense way. However, as review papers providing a holistic picture of the overall thematic field of QoL were not available, a CLR using a generative machine learning process was implemented to identify topics discussed in the 893 papers published in ARQOL between May 2006 and January 14th 2021. Following several data preparation steps, the resulting corpus was handed over to a probabilistic LDA algorithm – a Bayesian Gibbs sampler – for topic detection. The five papers computationally determined as best matching the resulting twelve topics were qualitatively screened for validation purposes and to explore them in more detail. Theoretical overlaps, similar methods, measurement constructs containing the same QoL impacting factors and identical catchwords listed below depict the content-related closeness between papers that led to the formation of the twelve
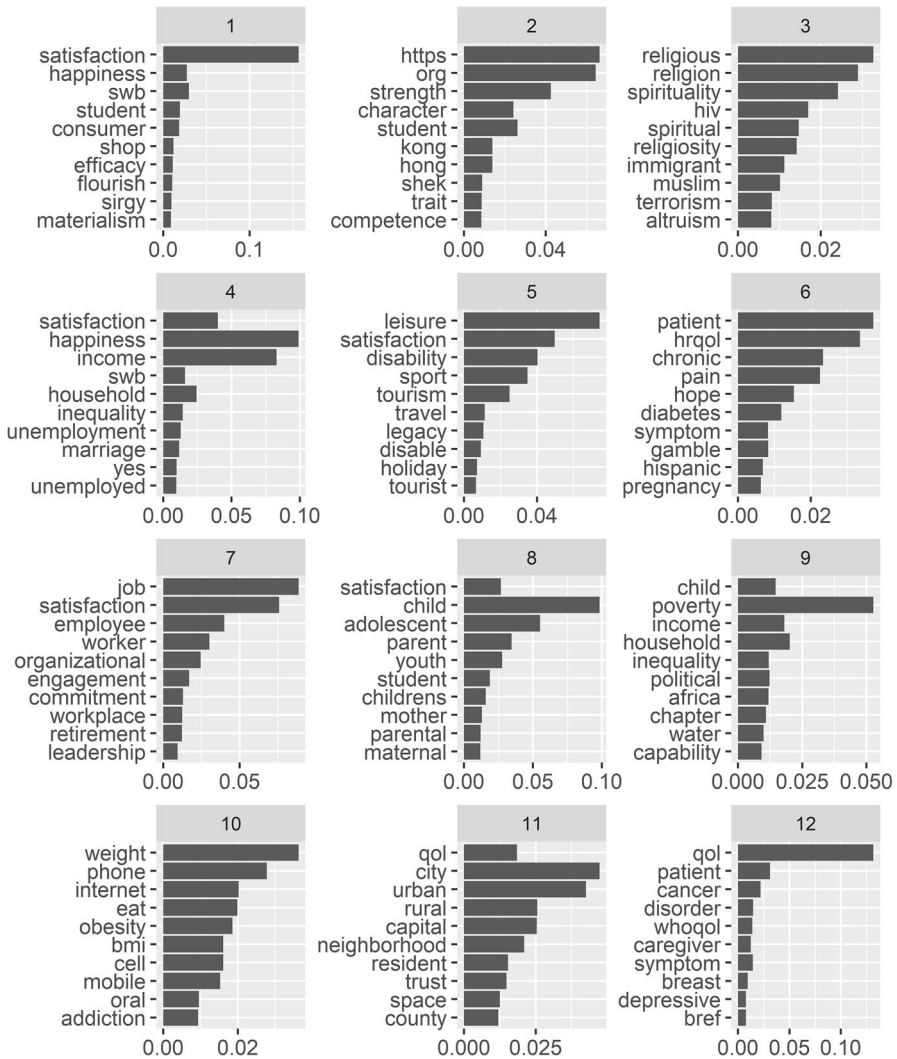
Fig. 2 ARQOL topics

topics. The following enumeration confirms the consistency of the topic names derived from the term clusters with the content presented in the top-5-ranked papers:

1) *Consumption and Materialism:* Quality of College Life (QCL) and Quality of Academic Life (QAL) focusing on services offered; hero attachment due to brands and products to enhance ones A-R–C (Autonomy, Relatedness, and Competence) need; Consumer Well-Being (CWB); shopping well-being and ill-being;

2) *Character Strengths:* European Social Survey (ESS) on personal and social well-being capturing evaluative/emotional/community wellbeing, functioning, vitality,

Table 2 Top-5-ranked papers per topic

Topic	Top-5-ranked papers	γ
1. Consumption & Materialism	Testing the mediating effect of the quality of college life in the student satisfaction and student loyalty relationship (Yu & Kim, 2008)	91.10%
	Does the quality of academic life matter for students' performance, loyalty and university recommendation? (Pedro et al., 2016)	89.01%
	Strong attachment to heroes: How does It occur and affect people's self-efficacy and ultimately quality of life? (Jun et al., 2016)	88.63%
	Consumer well-being (CWB): The effects of self-image congruence, brand-community belongingness, brand loyalty, and consumption recency (Grzeskowiak & Sirgy, 2007)	88.15%
	The effects of shopping well-being and shopping ill-being on consumer life satisfaction (Ekici et al., 2018)	86.83%
2. Character Strength	Differential relationships of light and darker forms of humor with mindfulness (Hofmann et al., 2020)	95.47%
	Character strengths and PERMA: Investigating the relationships of character strengths with a multidimensional framework of well-being (Wagner et al., 2020)	92.13%
	Character strengths – stability, change, and relationships with well-being changes (Gander et al., 2020)	91.26%
	Psychometric characteristics of the German values in action inventory of strengths 120-item short form (Höfer et al., 2020)	90.46%
	Validation of the 2012 European Social Survey measurement of wellbeing in seventeen European countries (Charalampi et al., 2020)	90.38%
3. Spirituality, Religiousness & Personal Beliefs	An Islamic perspective on coping with life stressors (Achour et al., 2016)	85.15%
	Combatting Jihadist terrorism: A quality-of-life perspective (Sirgy et al., 2018)	84.15%
	Losing my religion: Exploring the relationship between a decline in faith and a positive affect (Krause & Pargament, 2017)	83.67%
	Resilient senior Russian-Australian voices: "We live to sing and sing to live" (Southcott & Nethsinghe, 2019)	83.12%
	Altruism and existential well-being (Xi et al., 2017)	79.46%

Table 2 (continued)

Topic	Top-5-ranked papers	γ
4. Inequality	The gender gap in globalization and well-being (Dluhosch, 2019)	90.02%
	Health care expenditure and economic growth in SAARC countries (1995–2012): A panel causality analysis (Khan et al., 2016)	89.76%
	Affluence and subjective well-being: Does income inequality moderate their associations? (Ng & Diener, 2019)	89.67%
	Work transitions, gender, and subjective well-being (Chung & Hahn, 2020)	88.38%
	Does money buy happiness in Turkey? (Ugur, 2019)	88.10%
5. Leisure & Tourism	Life satisfaction and the UEFA EURO 2016: Findings from a nation-wide longitudinal study in Germany (Mutz, 2019)	85.16%
	Examining the importance of legacy outcomes of major sport events for host city residents' quality of life (Ma & Kaplanidou, 2017)	83.25%
	Understanding leisure trip experience and subjective well-being: An illustration of creative travel experience (Huang et al., 2020)	82.72%
	Life satisfaction in persons with late effects of polio (Lund & Lexell 2011)	82.46%
	A measure of quality of life in elderly tourists (Woo et al., 2016)	82.31%
6. Health-related QoL (HRQoL) I	Health related quality of life after percutaneous coronary revascularisation in patients with previous coronary artery bypass grafts: A two-year follow up study (Viswanathan et al., 2011)	94.51%
	Assessment of the construct validity of the EQ-5D in patients with acute cough/lower respiratory tract infections (Oppong et al., 2011)	90.60%
	The effect of dispositional optimism in HRQoL in patients with chronic musculoskeletal pain conditions in Greece (Tsakogia et al., 2011)	90.20%
	Threats to the internal validity of spinal surgery outcome assessment: Recalibration response shift or implicit theories of change? (Finkelstein et al., 2014)	89.25%
	Clinical validation of PROMIS global short form in pregnancy (Lundsberg et al., 2018)	87.32%

Table 2 (continued)

Topic	Top-5-ranked papers	γ
7. Quality of Working Life (QWL)	Different types of work–family balance, social support, and job satisfaction: A latent class analysis (Yucel, 2020)	93.35%
	Influences of work-family interface on job and life satisfaction (De Simone et al., 2014)	92.68%
	The effect of work/family conflict on intention to quit: The mediating roles of job and life satisfaction (Rode et al., 2007)	91.74%
	Job autonomy and schedule flexibility as moderators of the relationship between work-family conflict and work-related outcomes (Yucel, 2018)	91.72%
	Varying responsibilities across job & home domains and employee well being (Rasool & Nasir, 2013)	90.91%
8. Childhood & Adolescence	Relationships between perceived paternal and maternal sacrifice and developmental outcomes of Chinese adolescents experiencing economic disadvantage (Leung & Shek, 2020b)	93.89%
	Parental sacrifice, filial piety and adolescent life satisfaction in Chinese families experiencing economic disadvantage (Leung & Shek, 2020a)	91.93%
	The influence of parental expectations and parental control on adolescent well-being in poor Chinese families (Leung & Shek 2019)	90.53%
	Parents, siblings, or friends? Exploring life satisfaction among early adolescents (Yucel & Yuan, 2016)	89.88%
	Relations of parenting styles and friendship quality to self-esteem, life satisfaction and happiness in adolescents (Raboteg-Saric & Sakic, 2014)	88.43%
9. Disparity & Development	A synthetic indicator of progress towards the millennium development goals 2, 3 and 4 in the least developed countries (LDCs) of Asia (Martín et al., 2018)	92.52%
	Income levels, governance and inclusive human development in Sub-Saharan Africa (Asongu & Odhiambo, 2019)	91.52%
	An assessment of millennium development goal (Mdg) 3 in least developed countries of Asia (Martín et al., 2015a)	89.79%
	An index of progress towards the MDG1 in Southern Africa and the Horn of Africa (Martín et al., 2013)	89.54%
	An index of economic and social development in a group of countries in Africa (Martín et al., 2015b)	89.02%

Table 2 (continued)

Topic	Top-5-ranked papers	γ
10. Disorder	Developing and Validating a Measure of Consumer Well-Being in Relation to Cell Phone Use (Sirgy et al., 2007)	85.38%
	Quality of life and general health perception in women with obesity do eating patterns make a difference? (Silva et al., 2008)	84.62%
	Examining the association between body mass index and weight related quality of life in black and white women (Cox et al., 2012)	84.06%
	Relationship between morbidly obese subjects' attributions of low general well-being, expectations and health-related quality of life: Five-year follow-up after gastric banding (Pristed et al., 2012)	82.59%
	Alcohol and Quality of Life Among Social Groups for the Elderly in São José dos Campos, Brazil (Santos et al., 2014)	79.65%
11. Community Issues	Social trust and health: A perspective of urban–rural comparison in China (Jiang et al., 2020)	91.71%
	Quality of life and recycling behaviour in high-rise buildings: A case in Hong Kong (Siu & Xiao, 2016)	90.51%
	Evaluation of life quality and its spatial mismatch with local economic development in large Chinese cities (Zeng et al., 2020)	88.42%
	Patterns of walking among employed, urban Canadians: Variations by commuting mode, time of day, and days of the week (Michelson & Lachapelle, 2016)	86.74%
	Assessment of socio-economic characteristics and quality of life expectations of rural communities in Enugu State, Nigeria (Nzeadibe & Ajaero, 2010)	86.59%

Table 2 (continued)

Topic	Top-5-ranked papers	γ
12. Health-related QoL (HRQoL) II	Comorbid social phobia and major depressive disorder: The influence of remission from depression on quality of life and functioning (Steiner et al., 2017)	92.11%
	Quality of life in patients with recurrent vasovagal or unexplained syncope: Influence of sex, syncope type and illness representations (St-Jean et al., 2008)	91.36%
	The association between post-traumatic stress and health-related quality of life in adults treated for a benign meningioma (Kangas et al., 2012)	91.05%
	Pychological factors associated with a better quality of life following head-up tilt testing (Lévesque et al., 2010)	91.01%
	Quality of life, anxiety and depression in soft tissue sarcomas as compared to more common tumours: An observational study (Ostacoli et al., 2014)	88.73%

and supportive relationships; Values In Action(-Inventory of Strength) (VIA-IS) classifying character strengths into six virtues (wisdom and knowledge, courage, humanity, justice, strengths that protect against excess, transcendence); Character Strengths Rating Form (CSRF); Positive emotion, Engagement, Relationships, Meaning and Accomplishment (PERMA) to measure hedonic and eudaemonic well-being; Big Five; Humor Mindfulness Relationship Model (HMRM);

3) *Spirituality, Religiousness & Personal Beliefs:* Islamic coping strategies and spiritual support mechanisms of Muslim employees; ill-being of militant Jihadist terrorism groups in the MENA (Middle East North Africa) region; interplay between positive affect, loss of faith, religious practices, compassion, emotional support provided to others, and meaning in life; a diasporic Russian Jewish community sharing linguistic and cultural heritage for mutual support, engagement, socialization, independence and resilience; altruism and Existential Well-Being (EWB);

4) *Inequality:* Gender gaps driven by import penetration, employment, marital status, housework, or income; Health Care Expenditure (HCE) and economic growth in South Asian Association for Regional Cooperation (SAARC) countries;

5) *Leisure & Tourism:* Sport event legacy (UEFA EURO 2016, World Games Taiwan 2009, Summer Deaflympics 2009, Summer Universiade Taipei 2009); Player Experience of Need Satisfaction (PENS) and creative travel experience; disabilities restricting Activities of Daily Living (ADL) measured with the leisure domain of the Life Satisfaction Questionnaire (LISAT-11); elderly tourists' travel motivation & constraints;

6) *Health Related QoL (HRQoL) I:* Effects of Percutaneous Coronary Revascularization (PCR) after Coronary Artery Disease/Bypass Grafts (CAD/CABG) analyzed with the Nottingham Health Profile (NHP), the Seattle Angina Questionnaire (SAQ), or the Short-Form 36 (SF-36) for medical outcomes; validating EuroQol 5D (EQ-5D) on acute cough/Lower Respiratory Tract Infections (LRTI); Short Form 6D (SF-6D); Health Utilities Index (HUI); chronic musculoskeletal disorders (MSD) evaluated by the Short-Form 12 (SF-12) Physical and Mental Component Summary (PCS & MCS), the Life Orientation Test-Revised (LOT-R), or the Visual Analogue Scale (VAS) for pain measurement; outcome after spinal surgery by the Oswestry Disability Index (ODI); Patient Reported Outcomes Measurement Information System (PROMIS) Global Short Form (GSF), Edinburgh Postpartum Depression Scale (EPDS), or Modified Kendler Social Support Index (MKSSI) during pregnancy;

7) *Quality of Working Life (QWL):* Effect of Work-Family/Family-Work Conflict (WFC/FWC) on job satisfaction/work engagement and job autonomy and schedule flexibility as moderators in the Job Demands-Resources (JD-R) model; Work-To-Family/Family-To-Work Enrichment (WTFE/FTWE); Work Interference with Family/Family Interference with Work (WIF/FIW); Utrecht Work Engagement Scale (UWES); intention to quit predictors; Work Facilitation with Family/Family Facilitation with Work (WFF/FFW);

8) *Childhood & Adolescence:* Maternal/Paternal Sacrifice Scale (MSA/PSA) on developmental outcomes (self-identity, self-determination, self-efficacy) using Walsh's family resilience framework; Authoritarian/Reciprocal Filial Piety (AFP/

RFP) scale; the influence of Paternal/Maternal Expectations of Children's Future scale (PECF/MECF) and Paternal/Maternal Control Scale (APCS/AMCS) on Cognitive Competence (CC) and the Clear and Positive Identity subscale (CPI) of the Chinese Positive Youth Development Scale (CPYDS); parent–child relationship, sibling and friend bullying; mother's and father's parenting style (authoritarian, authoritative and permissive) on Rosenberg Self-Esteem Scale (RSES)/ Student's Life Satisfaction Scale (SLSS), Subjective Happiness Scale (SHS)/ Perceived Parenting Style Survey (PPSS)/Friendship Quality Scale (FQS);

9) *Disparity & Development:* Linking income-driven governance (voice & accountability and political stability/no violence for political governance, regulation quality and government effectiveness for economic governance, rule of law and corruption-control for institutional governance) and inclusive human development in Sub-Saharan Africa; fulfillment of MDG1 (Millennium Development Goal) (eradicate extreme poverty and hunger) in Southern Africa/Horn of Africa, MDG2 (achieve universal primary education), MDG3 (gender equality and women's empowerment), and MDG4 (reduce child mortality) in Least Developed Countries (LDC) of Asia, or all MDGs in African countries;

10) *Disorder:* Morbidly obese subjects' pre-operative expectations and after gastric banding evaluations; benefits/costs of cell/mobile phone use domains (social/leisure/family/education/health and safety/love, work, financial life); non-normative eating behavior [Binge Eating Disorder (BED), Night Eating Syndrome (NES), sweet/fat food cravings, continuous nibbling] of women to bariatric surgery with Obesity Related Well-being (ORWELL-97); women's race (black/white) moderating the relationship between the Impact of Weight on Quality of Life (IWQOL-Lite) and Body Mass Index (BMI); elderly's alcohol consumption in São José dos Campos-Brazil using the Alcohol Use Disorders Identification Test (AUDIT)/ Oral Health Impact Profile (OHIP-14);

11) *Community Issues:* Urban–rural comparison in China; waste recycling behavior in Hong Kong's high-rise buildings to improve public living environment by Use of Public Recycling Facilities (UPRF)/Use of Private Recycling Sectors (UPRS) models; Local Economic Development (LED) in large Chinese cities (basic life, housing conditions, education & culture, health and medicine, social security, urban transportation, physical environment, recreation); linking walking patterns among employed urban Canadians and commuting modes/time of day/ days of week/purposes; social, infrastructural and economic conditions in rural communities in Enugu State/Nigeria;

12) *Health Related QoL (HRQoL) II:* (Abbreviated) World Health Organization QoL (WHOQOL-100/WHOQOL-BREF) questionnaire: negative affect [Quality of Life, Enjoyment, and Satisfaction Questionnaire (Q-LES-Q)], functioning [Work and Social Adjustment Scale (WSAS)], and depressive symptom severity [Quick Inventory of Depressive Symptomatology-Self Report (QIDS-SR)] from comorbid Social Phobia (SP), Major Depressive Disorder (MDD), and remission measured with the Psychiatric Diagnostic Screening Questionnaire (PDSQ); patients with Vasovagal (VVS)/unexplained syncope (US) using the Illness Perceptions Questionnaire-Revised (IPQ-R), the Quality of Life Systemic Inventory (QLSI), Tilt-Table Testing (TTT), Head-Up Tilt Testing (HUTT), the

Pain Self-Efficacy Questionnaire (PSEQ), the Primary Care Evaluation of Mental Disorders (PRIME-MD), the Diagnostic and Statistical Manual-Revision 4 (DSM-IV), the Psychatric Symptom Index (PSI), and the Lifetime Number of Syncope (LNS); Post-Traumatic Stress Symptoms/Disorders (PTSS/PTSD) of adults treated for primary benign Meningioma (MGM); anxiety/depression of patients under chemotherapy due to Soft Tissue Sarcomas (STS) assessed by the Functional Assessment of Cancer Therapy-General (FACT-G) and the Hospital Anxiety and Depression Scale (HADS); WHOQoL-BREF as Patient Reported Outcome (PRO) domains (physical, psychological, social relations, environment).

All twelve topics are hot topics. Most of them already attract transnational attention for a considerable time, e.g., disparity and development (9) focus on specific Sustainable Development Goals (SDGs) (United Nations 2021). Others do not explicitly name them but are devoted to one or several of the 17 SDGs, e.g., inequality (4) tackles gender disparities that will be stressed even more in the future and concern not only specific countries. Likewise, disorder (10) and resulting obesity problems, burn-out in relation with quality of working life (QWL) (7) is already included in the 11th Revision of the International Classification of Diseases (ICD-11) and classified as a "factor influencing health status" (World Health Organization 2019), or health related QoL (6) issues due to musculoskeletal disorders of desk work are problems rising special attention of highly developed countries nowadays. Especially, depression as a subtopic of health related QoL (12) has been identified as a worldwide problem by the World Health Organization's (WHO) Department of Mental Health and Substance Abuse (Marcus et al., 2012). Changes driven by information technology (IT) advancements are mobile working and home office that will impact community issues (11) in the future as well. Finally, topics like consumption & materialism (1), spirituality, religiousness & personal beliefs (3), and leisure & tourism (5) are pull factors elicited by shifts in the way of living, generational changes and mobility, degrowth or ethical motivations, or improvements in character strength (2) or childhood and adolescence (8).

Overall, the proposed CLR methodology has demonstrated itself capable of detecting heavily discussed topics partly captured by SLRs published in ARQOL in the past. CLR can quickly grasp the content of a journal in a highly efficient and objective way. Hence, QoL topics can be determined at fine-grained or coarse levels depending on the granularity requested of the LDA. Special issue or conference topic suggestions can be identified in this way. From a more inter-disciplinary perspective, overlaps between different scientific fields can also be uncovered.

Limitations and Further Research

Some concerns related to the data preparation steps must be mentioned. First, seldomly used terms and untypical modifications with neglectable influences on the outcome cannot be lemmatized. Second, the lemmatization step cannot process acronyms and initialisms and match them with their fully expounded counterparts. Therefore, it cannot transform 100% of the terms to their lemmas. However,

the significance of abbreviated terms is enhanced by the term-frequency inverse document frequency weight to account for their discriminating power in a paper due to the resulting low number of occurrences of the unabbreviated term. Third, polysemy and ambiguity describe the problem that many meanings may exist for the same term. But this is partly solved as LDA addresses this problematic by simultaneously connecting terms with different meanings to multiple topics.

With regards to further research, one of the most interesting extensions lies in the inclusion of more QoL-related journals, e.g., surveying all ISQOLS affiliated journals (Social Indicators Research, Journal of Happiness Studies, Quality of Life Research, Psychology of Well-Being, Health and Well-Being, International Journal of Community Well-being, and the International Journal of Wellbeing) to study well-being from a more comprehensive point of view. Analyses based on such broader list of journals should reveal a list of topics at an overarching framework, e.g., the life quality and well-being (LQW) model (Skevington & Böhnke, 2018). However, as the focus of the current study was to determine QoL domains, selection of a single journal, here ARQOL, has been preferred.

Alternatively, running the same algorithm in a cross-sectional approach focusing solely on online first articles would reveal upcoming research streams in the field of QoL, such as the COVID-19 pandemic (Shek 2021). Next to cross-sectional analyses, longitudinal attempts could provide insights into the development of the field by revealing topics that have gained or lost prominence over the years. A critical look at emerging topics should provide insights about their actual importance, both now and into the future, while the recognition of important topics that have drifted from popularity may prompt reinforcement strategies including a relaunch in the form of a special issue to shine a spotlight and generate academic interest.

In addition to CLRs, qualitative analysis of QoL related papers would uncover emerging topics which might claim for themselves a topic of their own in the future that cannot be detected by CLRs, e.g., the rise of living alone (Klinenberg, 2016), climate change related QoL (Estoque et al., 2018), or quality of virtual life (Novak, 2012).

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