Mapping the Intellectual Structure of Leisure Quality

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***Abstract*—To explore the intellectual structure of leisure quality research in the last decade, this study identified the most important publications and the most influential scholars as well as the correlations among these scholar's publications. In this study, bibliometric, social network analysis techniques are used to investigate the intellectual pillars of the leisure quality literature. By analyzing 120,386 citations of 2,738 articles published in SCI and SSCI journal in leisure quality area between 2006 and 2015, this study maps a knowledge network of leisure quality studies. The results of the mapping can help identify the research direction of leisure quality research and provide a valuable tool for researchers to access the literature in this area.**

***Index Terms* —leisure quality; Subjective Well-being; Physical Activity and Public Health; Quality of Life; Exercise**

I. Introduction

Leisure quality is generally conceptualized as an individual's subjective well-being that sense from satisfaction or dissatisfaction with the areas of life that are important to improve the life quality [1, 2]. In this study, we use leisure quality in the sense of subjective well-being, physical activity and public health, leisure stress coping, or quality of life. A leisure quality is a dynamic distributed system of wireless nodes that move independently of each other [3]. The past decade has especially seen extensive research on leisure quality. Yet even though leisure quality has established itself as an academic discipline, its establishment has been a slow process because researchers in this area prefer to publish their best work in more established journals. Another major obstacle to the development of leisure quality lies in the subject's unusually high degree of interaction with other disciplines. This overlapping blurs the boundaries of leisure quality and as a result its distinct theoretical model and analytical tools are unjustly attributed to other competing fields. With limited resources contributing to the development of leisure quality, the cross-fertilization of ideas between scholars of leisure quality will be much more difficult to obtain. Consequently, while there is no doubt that there is an area or field of leisure quality, the question remains somehow unclear on what it is, how good its work is, and what are its prospects and needs for future development.

The objective of this study is to provide leisure quality researchers with a unique map to better understand leisure quality related publications and to provide a systematic and objective mapping of different themes and concepts in the development of leisure quality field. This study also attempts to help identify the linkage among different publications and confirm their status and positions in their contribution to the development of leisure quality field. The principal methods used are citation and co-citation analysis, social network analysis, plus a factor analysis which is performed to identify the invisible network of knowledge generation underlying the leisure quality literature.

II. Studies of Academic Literature

There are a number of techniques that can be used to study a body of literature. Most frequent is the simple literature review where a highly subjective approach is used to structure the earlier work. Objective and quantitative techniques have recently become popular with more databases available online for use. These techniques adopt author citations, co-citations, and systematic review [4] to examine the invisible knowledge network in the communication process by means of written and published works of a given field. These techniques are attractive because they are objective and unobtrusive [5].

Several studies have used the bibliometric techniques to study the literature of management research. For example, Taylor, Dillon and van Wingen [6] explored the intellectual structure a of Information systems research,

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the discipline has shifted from fragmented adhocracy to a polycentric state, which is particularly appropriate to an applied discipline; Garcia-Lillo and Ubeda-Garcia [7] identified the most influential authors and studies in hospitality management field by using co-citation analysis; Zhang, chen and Li [8] explored a new approach to reveal co-citation relationships, using the original paper-reference matrix as the information source, and transform the paper-reference matrix into an visual analyses.; Lin, McLee and Kuo [9] explored the research paradigms of web services research by applying factorial analysis techniques in an author co-citation study. To the best of our knowledge, no similar study has been conducted on the current research of knowledge management. Therefore this study aims to fill a gap in knowledge management literature by applying citation and co-citation analysis to a representative sample of recent research on knowledge management collected by the Science Citation Index and Social Sciences Citation Index

III. Methodology

The citation data used in this study included journal articles, authors, publication outlets, publication dates, and cited references. Based on the objective of this study, the authors explored the intellectual structure of leisure quality between 2006 and 2015. This time period was chosen because contemporary leisure quality studies of the last five years represent the most update and probably also the most important research on leisure quality. Citation and co-citation analysis is the main method for this study. First, the databases were identified as the sources of leisure quality publications. Then data collection and analysis techniques were designed to collect information about topics, authors, and journals on leisure quality research.

In the second stage, the collected data were analyzed and systematized by sorting, screening, summing, sub-totaling, and ranking. After a series of operations, key nodes in the invisible network of knowledge in leisure quality were identified and the structures developed. In the final stage, the co-citation analysis was used and the knowledge network of leisure quality was mapped to describe the knowledge distribution process in leisure quality area.

In this study, the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) were used for analysis. The SCI and SSCI are widely used databases, which include citations published in over 10,000 world's leading scholarly journals. While there are arguments that other online databases might also be used for such analysis, using SCI and SSCI provided the most comprehensive and the most accepted databases of leisure quality publications.

Unlike other prior studies, the data used in this study were not drawn from journals chosen by peer researchers [10]. Instead, the entire databases of SCI and SSCI from 2006 to 2015served as the universe for analysis. In order to collect the data, we used "key word" method which utilizes the SCI and SSCI databases key word search in article's title and abstract. Using "leisure"and"quality" as key word, this study collected 2,738 journal articles which further cited 120,386 publications as references. The cited references in these papers included both books and journal articles.

IV. Results

Citation Analysis. The most influential documents with the most citation and the most influential scholars were then identified by their total counts of citation within the selected journal articles. As shown in Table 1 , the most cited leisure quality publication between 2006 and 2010 the first five years) were Glaser's book Developing Grounded Theory, followed by World Health Organization's book International Classification of Functioning, Disability and Health, and Miles's book Qualitative Data Analysis (see Table 1). For the second five years (2011-2015), the three most cited leisure quality publications were World Health Organization's book International Classification of Functioning, Disability and Health, followed by Craig's paper International Physical Activity Questionnaire, and Godin's paper A simple method to assess exercise behavior in the community (See Table II).

TABLE I. Highly Cited Documents: 2006-2010

Full Citation Index for Document	Total citations
Glaser BG, 1967, Developing grounded theory	30
World Health Organization, 2001, International classification of functioning, disability and health	30
Miles MB, 1994, Qualitative Data Analysis	29
US Department of Health and Human Services, 1996, Physical Activity and Health: A Report of the Surgeon General	28
Ware JE, 1992, MED CARE, V30, P473	27
Pate RR, 1995, JAMA-J AM MED ASSOC, V273, P402	22
Baron RM, 1986, J PERS SOC PSYCHOL, V51, P1173	19
Stebbins R. A., 1992, Amateurs, Professionals, and Serious Leisure	19
Trost SG, 2002, MED SCI SPORT EXER, V34, P1996	18
Strauss AL, 1998, Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory	17

Journal articles and books combined, the top five most cited scholar between 2006 and 2010 (the first five years) were Stebbins, Ware, Diener, Sallis, and Courneya (See Table 3). For the second five years, the status of the most important scholars changed. The top five most cited scholars were Ainsworth, Diener, Lancion, Iwasaki, and Csikszentmihalyi (See Table 4). These scholars have the most influence in the development of leisure quality area and thus collectively define this field. Their contributions represent the focus of the main research in the field and thus give us an indication of the popularity of certain leisure quality topics as well as their historical values. A

comparison between Table 1 and 2 reveals some interesting patterns from the first five years (2006-2010) to the second five years (2011-2015). The World Health Organization most influential publications in the last five years remain the same, indicating their dominant status for the past five years in leisure quality studies.

TABLE II. HIGHLY CITED DOCUMENTS: 2011-2015

Full Citation Index for Document	Total citations
World Health Organization, 2001, International classification of functioning, disability and health	75
Craig CL, 2003, MED SCI SPORT EXER, V35, P1381	47
Godin G, 1985, Canadian Journal of Applied Sport Sciences, V10, P141	44
Ware JE, 1992, MED CARE, V30, P473	44
Diener E, 1985, J PERS ASSESS, V49, P71	38
Fornell C, 1981, J MARKETING RES, V18, P39	38
Folstein MF, 1975, J PSYCHIAT RES, V12, P189	37
Patton M. Q., 2002, Qualitative Research & Evaluation Methods	34
Diener E, 1999, PSYCHOL BULL, V125, P276	32
Iwasaki Y, 2007, SOC INDIC RES, V82, P233	32

Although the citation analysis does not eliminate the bias against younger scholars, a paper-based ranking (as in Table 1 & 3) places more emphasis on the quality (as opposed to the quantity) of the documents produced by a given scholar than a ranking of authors based on the frequencies with which a particular author has been cited (as in Table 3 & 4). In addition, Table 1 and 3 represent the key research themes in a field and give us an indication of the popularity of certain leisure quality topics. The readers can find high citations are associated to what can be termed field-defining titles and they lay down the ground work for the understanding of leisure quality as a distinct phenomenon.

TABLE III. HIGHLY CITED AUTHORS: 2006-2010

Author	Frequency	Author	Frequency
Stebbins R. A.	79	Henderson KA	60
Ware JE	77	Bowling A	51
Diener E	67	Csikszentmihalyi M.	50
Sallis JF	67	Iwasaki Y	49
Courneya KS	66	Law M	42

TABLE IV. HIGHLY CITED AUTHORS: 2011-2015

Author	Frequency	Author	Frequency
Ainsworth BE	195	Law M	106
Diener E	145	Sallis JF	102
Lancioni GE	124	Sirgy MJ	97
Iwasaki Y	117	Stebbins R. A.	93
Csikszentmihalyi M.	117	King G	81

Co-citation Analysis. In this stage, data mapping was conducted and an intellectual structure of current leisure quality studies was revealed. Co-citation analysis is a bibliometric technique that information scientists use to map the intellectual structure of an academic field. It involves counting documents from a chosen field - paired or co-cited documents. Co-citation analysis compiles co-citation counts in matrix form and statistically scales them to capture a snapshot at a distinct point in time of what is actually a changing and evolving structure of knowledge [11].

Co-citations were tabulated for each source documents by using the Excel package. Many of the authors had very few co-citations that were either unlikely to have had a significant impact on the development of the field or were too new to have had time to impact on the literature. To facilitate analyses and improve the probability of its success, it was made sure that all authors in the final set had at least 30 citations in the first five years and 30 in the second five years. Based on the total number of citations in the selected journals, the top scholars were identified, and then a co-citation matrix was built before a pictorial map was drawn to describe the correlations among different scholars. In doing so, we were following the procedures recommended by White and Griffith [12].

Social network analysis techniques were used to graph the relationships in the co-citation matrix and identify the strongest links and the core areas of interest in leisure quality [4]. Figure 1 and Figure 2 show the core research themes in leisure quality studies, based on sampled articles with links of greater than or equal to ten co-citations shown in the network. This is produced using UCINET software [6] and shows graphically the core areas of interest. Different shapes of the nodes result from performing a faction study of these authors. This method seeks to group elements in a network based on the sharing of common links to each other. The diagrams show that current research in leisure quality area is concentrating on the interactions of essential of Physical Activity and Public Health, Subjective Well-being, Exercise Intensity and Longevity in Men and Pediatric Qualify of Life Inventory. The few scholars in Figure 1 and 2 with the most links (co-citation) are the super stars in leisure quality research. Their heavy citations and intensive interlinks with each other undoubtedly indicate their prestigious status in leisure quality research and their publications and research work collectively define the future research directions of leisure quality studies.

While the diagrams in Figure 1 and Figure 2 provide a clear picture, their foci are only on the very core areas and only a limited amount of information is revealed. By taking the co-citation matrix and grouping the authors using factor analysis of the correlations between the entries, we can determine which authors are grouped together and therefore share a common element. According to this, the closeness of author points on such maps is algorithmically related to their similarity as perceived by citers. We use r-Pearson as a measure of similarity between author pairs, because it registers the likeness in shape of their co-citation count profiles over all other authors in the set [13].

The co-citation correlation matrix was factor analyzed using varimax rotation, a commonly used procedure, which attempts to fit (or load) the maximum number of authors on the minimum number of factors. The diagonals were considered missing data and were applied the criterion of omitting the two cases [8].

Ten factors were extracted from the data in the first five years (2006-2010) and together they explained over 80.4% of the variance in the correlation matrix. Table 5 lists the ten most important factors along with the authors that had a factor loading of at least 0.45. As is usual in this type of analysis, authors with less than a 0.5 loading or with cross-loadings were dropped from the final results [12]. We tentatively assigned names to the factors on the basis of our own interpretation of the authors with high loadings. Our interpretation of the analysis results is that leisure quality research in this period is composed of at least ten different sub-fields: Exercise Intensity and Longevity in Men, Pediatric Qualify of Life Inventory and Health Survey, Statistical Power Analysis for the Behavioral Sciences, Health-related Behaviors, Subjective Well-being, Analysis of Womens Leisure, Physical Activity and Public Health, Qualitative Data Analysis, and Serious Leisure (Please see Figure 1). We made no attempts to interpret the remaining factors due to their small eigenvalues. They have also been excluded from Table 5.

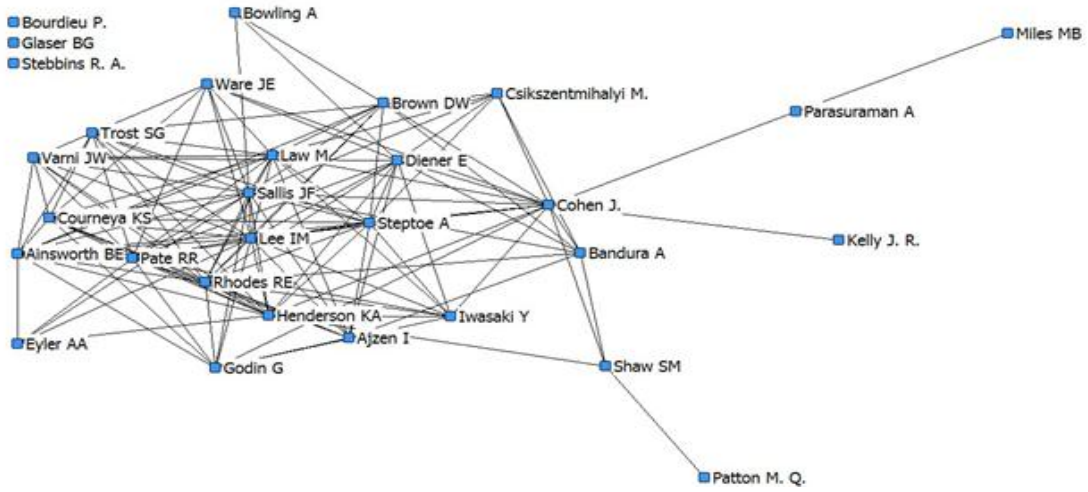

Figure 1. Key Research Themes in leisure quality (2006-2010)

TABLE V. AUTHOR FACTOR LOADINGS: 2006-2010

Factor 1		Factor 2		Factor 3		Factor 4	
Exercise Intensity and Longevity in Men	23.70% Variance	Pediatric Qualify of Life Inventory	12.30% Variance	Health Survey	9.60% Variance	Statistical Power Analysis for the Behavioral Sciences	6.90% Variance
Lee IM	0.965	Varni JW	0.105	Bowling A	0.936	Cohen J	0.839
Trost SG	0.923	Patton MQ	0.085	Henderson KA	0.928	Varni JW	0.78
Sallis JF	0.789	Rhodes RE	0.074	Eyler AA	0.905	Iwasaki Y	0.593
Ainsworth BE	0.701	Stebbins RA	0.073	Bandura A	0.565	Ware JE	0.505
Steptoe A	0.678	Ajzen I	0.062	Ainsworth BE	0.5		
Courneya KS	0.532						
Rhodes RE	0.507						

Factor 5		Factor6		Factor 7		Factor 8	
Health-related Behaviors	6.20% Variance	Subjective Well-being	5.40% Variance	Analysis of Womens Leisure	4.70% Variance	Physical Activity and Public Health	4.30% Variance
Godin G	0.927	Diener E	0.822	Shaw SM	0.874	Pate RR	0.925
Ajzen I	0.894	Csikszentmihalyi M.	0.709	Patton MQ	0.482	Courneya KS	0.499
Courneya KS	0.538	Bandura A	0.484			Steptoe A	0.472
Rhodes RE	0.508						
Factor 9		**Factor10**					
Qualitative Data Analysis	3.90% Variance	Serious Leisure	3.40% Variance				
Miles MB	0.925	Stebbins RA	0.607				
Parasuraman A	0.545	Glaser BG	0.543				
		Bourdieu P.	0.534				

Similarly, studies on leisure quality also clustered on different research themes between 2011 and 2015 and together they explained over 77.6% of the variance in the correlation matrix of the second five years, as pictured in Table 6 lists the night most important factors along with the authors that had a factor loading of at least 0.45. We also tentatively assigned names to the factors on the basis of our own interpretation of the authors with high associated loadings. Our interpretation of the analysis results is that leisure quality research at this stage is also composed of at least night key sub-fields: Physical Activity and Public Health, Subjective Well-being, Materialism and Quality of Life, Quality and Credibility of Qualitative Analysis, Behavioral Consequences of Service Quality, Physical Activity and Multiple Sclerosis, Physical Activity in Older Adults, Environmental Influences on Walking.

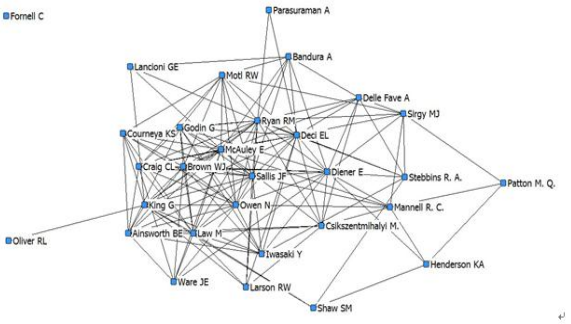

Figure 2. Key Research Themes in leisure quality (2011-2015)

TABLE VI. AUTHOR FACTOR LOADINGS: 2011-2015

Factor 1		Factor 2		Factor 3		Factor 4	
Physical Activity and Public Health	20.20% Variance	Subjective Well-being	15.80% Variance	Leisure Stress Coping	11.90% Variance	Materialism and Quality of Life	8.20% Variance
Brown WJ	0.936	Diener E	0.837	Iwasaki Y	0.979	Sirgy MJ	0.957
Sallis JF	0.931	Csikszentmihalyi M.	0.729	Law M	0.975	Delle Fave A	0.921
Ainsworth BE	0.915	Stebbins R.A.	0.729	Lancioni GE	0.961	Mannell R.C.	0.667
Craig CL	0.902	Deci EL	0.613	Oliver RL	0.781	Stebbins R.A.	0.464
Courneya KS	0.817						
Godin G	0.626						
Ware JE	0.525						

Factor 5		Factor 6		Factor 7		Factor 9	
Quality and Credibility of Qualitative Analysis	5.40% Variance	Behavioral Consequences of Service Quality	4.70% Variance	Physical Activity and Multiple Sclerosis	4.20% Variance	Physical Activity in Older Adults	3.60% Variance
Patton M.Q.	0.833	Parasuraman A	0.866	Motl RW	0.926	McAuley E	0.856
Henderson KA	0.613	Larson RW	0.810	Courneya KS	0.492	Godin G	0.477
Shaw SM	0.555	Ryan RM	0.730				
Mannell R.C.	0.554	Deci EL	0.518				

Factor 10							
Environmental Influences on Walking	3.50% Variance						
Owen N	0.620						
Fornell C	0.597						

V. CONCLUSION

The past decade have extensive research on leisure quality. This study investigates leisure quality research using citation and co-citation data published in SCI and SSCI between 2006 and 2015. With a factor analysis of the co-citation data, this study maps the intellectual structure of leisure quality research, which suggests that the contemporary leisure quality research is organized along different concentrations of interests: Physical Activity and Public Health, Subjective Well-being and Leisure Stress Coping.

Given that the leisure quality is still young and our analysis has shown that it has an evolving structure, it is believed that leisure quality publication outlets will gain more popularity and prestige that is required to become a more prominent academic field when we learn more about current paradigms and the key research themes in leisure quality studies, how they relate, and what they stand for. With more scholars and more resources contributing to the leisure quality area, a better academic environment conducive for research ideas' cross-fertilizing will be formed and leisure quality, as a field, will gain more momentum for further development.

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