

Scientific Publication Patterns of Interactive Mobile Technologies for Psychological, Social, Medical and Business Interventions for Mental and Physical Health: Bibliometric Analysis

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Abstract—There has been emerging interest in the effectiveness of interactive mobile technology usage in psychological, social, medical and business interventions. However, the field still lacks holistic overviews of the role of technology for psychological, social, medical and business interventions. The present bibliometric study was employed to identify and synthesize the results from studies exploring domains of interactive mobile technology used in applied psychology and counseling, supporting health professionals, managing mental and physical health, humanizing technology and improving its efficiency in the business field, as well as in the social field including vocational education, safeguarding, communities and ethnic minorities. An author analyzed the papers published in highly ranked and cited journals which were indexed and ranked in the Web of Science Core Collection and Scopus, in the period of 2020 to 2021. The results demonstrated high interest in studied domains within various subjects and fields of study, demonstrating the interest in the opportunities which provide the technology for professional education and developing methodological competences.

Keywords—interactive mobile technology, interventions, mental and physical health, well-being, bibliometric analysis

1 Introduction

Recent studies on using interactive mobile technologies in various fields indicated its significant impact on received outcomes [1]. Technology increases overall mental and physical well-being [2], enhances gaining knowledge and professional competencies [3], and provides efficient opportunities to successfully deal with suicide [4], stress [5], addictions [6], [7], psychosis [8], [9], pain [10], cancer [11] etc. Although some studies on technology used in the mentioned fields have been conducted, there still remain unanswered questions. The majority of studies explored the use of technology in a specific and narrow field [12], [13]. Therefore, more interdisciplinary studies are

required to examine the use of interactive mobile technology in providing professional interventions in various fields to maintain mental and physical well-being. Consequently, this paper aims to gather, analyze and synthesize available studies in the mentioned fields to establish a holistic approach to the understanding of interrelations between use of interactive mobile technology and psychological, social, medical and business interventions.

2 Literature review

Recently, interactive mobile technology gained its popularity in various fields, since it provides wider opportunities for practitioners working in mental and physical health fields, with various social groups and communities, or developing and testing available technologies. Interactive mobile technology is viewed as both an intervention and an educational tool. This requires effective strategies and methods helping practitioners and individuals cope with various mental and physical difficulties and to improve their well-being. Interactive mobile technology makes available new tools for interventions which offer wider opportunities and more efficient outcomes. These technological tools are then applied in psychology, counseling, organizational psychology, vocational education, business and social fields.

Recent studies have explored the success of incorporating interactive mobile technology into well-being programs. Lush et al. [2] presented a self-assessment and self-management mental health tool which might support individuals with mental illnesses in maintaining their life quality. McAlaney et al. [14] explored cultural differences in acceptance of a preventive digital addiction technology. The significant impact of music playlists on the well-being model was indicated by Sice et al. [15]. Study by Grant et al. [16] stated that involving young people in the design of e-health technologies contributes to efficient adoption and prolonged usage of them. Califf, Stumpf and Frye [17] focused on the role of technology in experiencing flow among employees.

Technology use is essential for training health professionals [18]. Study by Sun, Wang and Shen [19] proposed a configurational protection motivation theory allowing to identify the potential effects of users on health information technology adoption. Faija et al. [20] studied factors enhancing practitioners' readiness to provide psychological interventions through mobile technologies. Similarly, Jacob, Sanchez-Vazquez and Ivory [21] explored technological, social and organizational determinants impacting clinicians' adoption of mHealth tools. Barriers among older adults in readiness to use the mobile-based mental health interventions were explored by Pywell et al. [22].

Studies on use of interactive mobile technologies in digital policing were conducted by Fussey, Davies and Innes [23], while the research on the usage of gamification and mHealth apps among police was made by Marston et al. [24].

Recent studies on the use of technologies in the field of mental health indicated its efficiency and novel opportunities. Samara et al. [5] studied the use of technologies among children exposed to severe stress of war trauma, while Quayle [25] explored the prevention and disruption of online sexual crime against children. Brown et al. [4] focused on efficiency of mobile applications in suicide prevention.

Holliday et al. [7] presented the successful use of an app that allows to complete home-hazard assessments as helpful in reducing the risk of falls and careers. Lee, Cheung and Chan [26] investigated the role-playing game addiction and offered a healthy virtual playground. Another study by File et al. [6] evaluated the efficiency of complex smartphone applications in decreasing the alcohol consumption. A similar study by Szinay et al. [27] explored determinants influencing the engagement with health and well-being smartphone apps among adults.

Macmillan et al. [28] indicated that autistic children experience significantly higher online safety risks and poorer well-being. Lobban et al. [8], [9] focused on critical factors that have an impact on staff's use of online self-management tools for relatives of patients with psychosis or bipolar disorder. A similar study on web-based self-management intervention to reduce stress among relatives of patients with psychosis or bipolar was conducted by Lobban et al. [29]. Sin et al. [30] assessed the effectiveness of digital intervention for family carers to promote mental well-being.

A literature review that presents the findings regarding pain management for genetic disorders on social media was conducted by Ashtari, Tasyolor and Lai [10]. Ball et al. [11] studied the efficiency of smartphone apps teaching mindfulness meditation among women with chronic pelvic pain. A digital intervention [31] and mixed intervention [32] on cancer pain was indicated as a feasible approach.

Study by Knox et al. [12] evaluated the efficiency of self-management apps for chronic obstructive pulmonary disease. Robinson et al. [33] explored a technological intervention to support mobility assistance dogs for people with tetraplegia. Bussone et al. [34] focused on establishing trustworthy and secure digital platforms for individuals with HIV. The mHealth based intervention for Parkinson's disease was recognized as feasible [35]. Uslu et al. [1] assessed the effectiveness of telerehabilitation apps among patients with aphasia.

Dormann et al. [36] stated that the game-based training increased knowledge and improved self-efficacy among professionals in vector control. Rough and Quingley [37] presented recommendations for the design of end-user development tools allowing non-programmers to develop "experience sampling" apps. A Study by Merhi et al. [38] evaluated the role of age and gender in consumer intentions and uptakes of mobile banking services. MacDonald et al. [39] focused on the potential of a digital health promotion application directed on decreasing sedentary behaviors across multiple workplace settings. A study by Powell et al. [40] explored the value that apps are currently generating and being reimbursed across the world.

Sabron et al. [41] studies the impact of smartphone usage on school students and the learning environment. Wuttke, Siefried and Niegemann [3] indicated the importance of digitization in vocational education and training since it improves the level of knowledge gained. Consequently, a study by McQuillan et al. [42] offers the design of a workshop improving graduates' resilience at future work. Virtual technologies as maltreatment tools were studied by Kavanagh, Litchfield and Osborne [13]. Liddle et al. [43] studied the technology design opportunities for social connectedness within a local community. Research on factors increasing vulnerability to cyber-attack among older adults during their retirement transition was conducted by Morrison, Coventry and Briggs [44]. Similar study on cyber-bullying among young people was done by Craig et al. [45].

3 Methodology

3.1 Purpose of the study and research questions

The primary purpose of this study is to explore scientific publication patterns in research domains of “Psychological Social Medical Business Interventions” concerning “Interactive Mobile Technologies” and “Mental and Physical Health”. The paper also aims to reveal the contribution of scientific knowledge by highlighting the gaps and directing the potential development areas for further studies. Based on the research scope and objectives, research questions are formed below;

RQ1 What are the descriptive characteristics of publication results? How many papers were published on “Positive Psychology Interventions” concerning “Interactive Mobile Technologies”?

RQ2 What are the publication trends in terms of the most productive authors, institutions and countries? What are the citation results of those authors?

RQ3 In which journal sources were the papers published most frequently and which publisher?

3.2 Bibliometric study

The bibliometric study enables researchers to explore patterns, trends, associations, and scientific developments in searched domains and interrelated fields over analysis of published data. It requires a structured bibliometric database to analyze the appropriate data to answer established research questions [46], [47], [48], [49] [50]. Bibliometric uses statistical methods to analyze the bibliometric descriptions of publications of data within peer-reviewed journal articles, books, conference proceedings, periodicals, reviews, reports, and related reports.

3.3 Data collection and extraction

A bibliometric study requires a structured database to analyze the publication data. The main bibliometric databases available for these reasons are Crossref, Microsoft Academic, PubMed, PubMed Central, Core. PubMed contents highest ranked and impacted (prestigious) sources, whereas Core also ranks the same sources besides more sources that coverages included conferences, and congress proceedings. All databases have their citation count categories. In this study, the PubMed database is supported by others mentioned above. The data collection strategy is used as a similar bibliometric study conducted in various research fields [46], [47], [48], [49] [50].

Search query;

Scholarly Works (80) = Interactive Mobile Technologies, Psychological Social Medical Business Interventions, Mental Physical Health

Filters: Year Published = (2020–2021) External ID Type = (Core, Crossref, Microsoft Academic, PubMed, PubMed Central) Publisher = (Emerald, National Institute for Health Research, BioMed Central, SAGE Publications, Elsevier BV, Institute of Electrical and Electronics Engineers (IEEE), BMJ Publishing Group)

The above mentioned search criteria was conducted, and the data retrieved was in plain .txt and excel .csv, file formats for further analysis. The Microsoft Excel and Lens platform (version 7.4) software with “bibliometrics” package used for descriptive and bibliometric data analysis.

4 Results

4.1 Publication profile and descriptive publication results

The search results show that a total of 174 studies have been published during the period of 2020–2021 years. The highest period among the published data set indicated the research conducted during June and July 2020. The majority of papers were published within Psychology, Psychological interventions, Medicine, and Sociology. The top five authors are Andrew Booth, Andrew Walker, Barbara Mezes and Duncan Appelbe, who published 12 papers altogether during 2020–2021. The leading institution in publishing papers is University College London (11 papers out of total 174) and the leading country is the United Kingdom (93 papers out of total 174). The top four publishers are Emerald (14 papers), National Institute for Health Research (13 papers), BioMed Central (10 Papers) and Sage Publications (9 papers). Among journals the leader is Health services and delivery research.

4.2 Distribution of publication by date and fields of study

Records start with n=6 in January 2000 and increase by n=16 in February 2020, then decrease to n=7 in May 2020. The sharp decrease can be seen in June (n=15) and July 2020 (n=23). September 2020 shows the lowest interest in publications in the data set for the analyzed research period (n=3). The publication distribution also supports downward movement till December 2020 in Figure 1. Psychology is a leading field with the number of publications every month except of September and November 2020. There is no clear publishing pattern among other fields of studies.

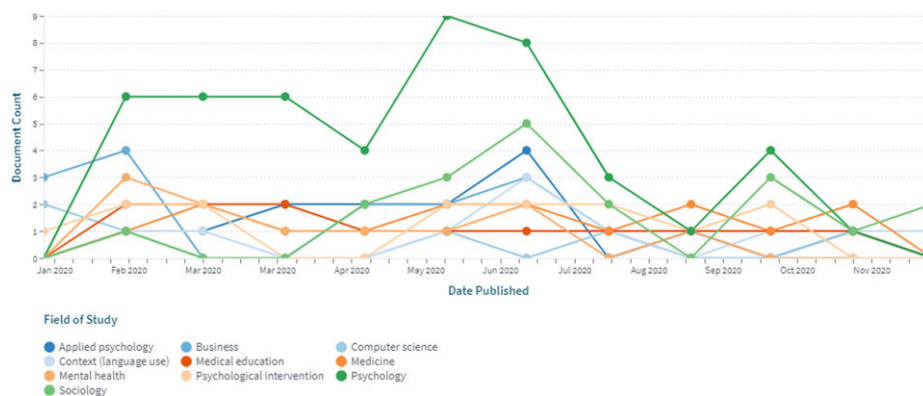


Fig. 1. The trend of publication count by field of study and date (2020–2021)



Fig. 2. The trend of publication count by subject and date (2020–2021)

Figure 2 shows the top subjects of study in this result set, based on the number of scholarly works. According to the provided results, the majority of papers were published within the Public Health, Environment and the Occupational Health (n=11) and Health Policy (n=10). Slightly less (n=7) papers were published in General Medicine, Health (social science) and Information Systems. The six papers were published in Education, General Computer Science and Psychiatry and Mental Health.

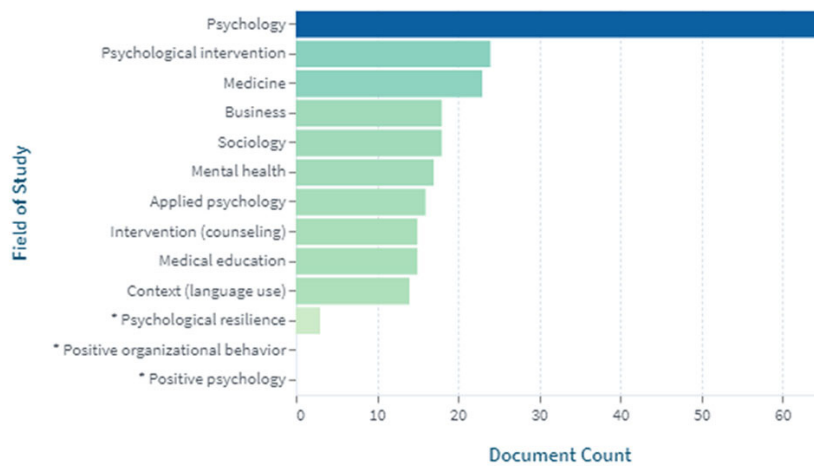


Fig. 3. The trend of publication count by field of study (2020–2021)

Figure 3 displays the top fields of study in this result set, based on the number of scholarly works. According to the results, the majority of papers were published within the Psychology field of study (n=63). Significantly less papers were published in Psychological intervention (n=19), Business and Sociology (n=18), Mental Health (n=17), Applied Psychology (n=16) and Intervention (counselling) (n=15).

4.3 Most productive authors, institutions and countries

Figure 4 indicates the author’s descriptive results by document count (the search was limited up to 10 names). The top four authors were Andrew Booth, Andrew Walker, Barbara Mezes and Duncan Appelbe (3 papers each). Thirty two authors published 2 papers each, sixty authors published 1 paper each.

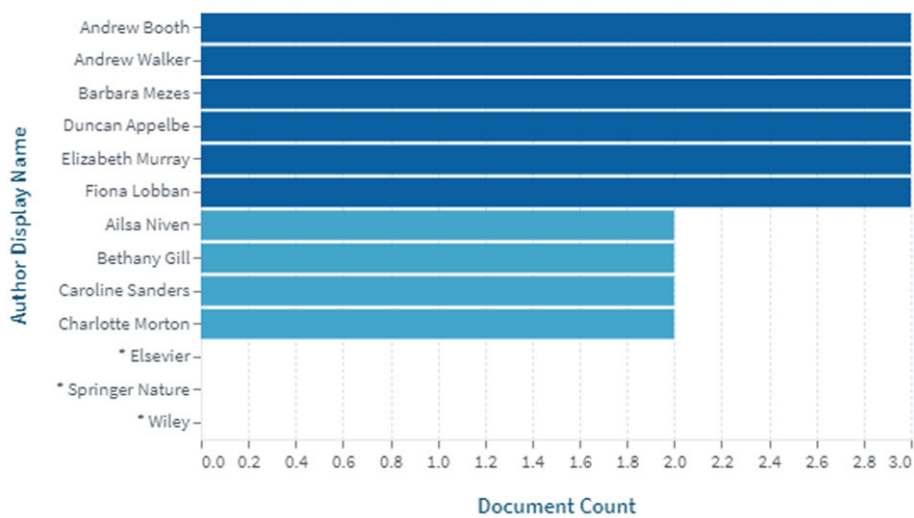


Fig. 4. The most productive authors (2020–2021)

Figure 5 shows the contributed institutions from countries around the world. According to the results, there are five top countries/regions including the United Kingdom (n=40), Australia (n= 11), Italy (n=7), United States (n=7), Ireland (n=6). University College London is leading institution with 10 papers (5.7% out of the total), followed by Cardiff University and University of Sheffield with 8 papers each (4.5% out of the total), Newcastle University and Northumbria University with 7 papers each (4% out of total). RMIT University is leading among Australian institutions with 5 publications (2.8%). Seven institutions published 2 papers each and twelve institutions 1 paper each.

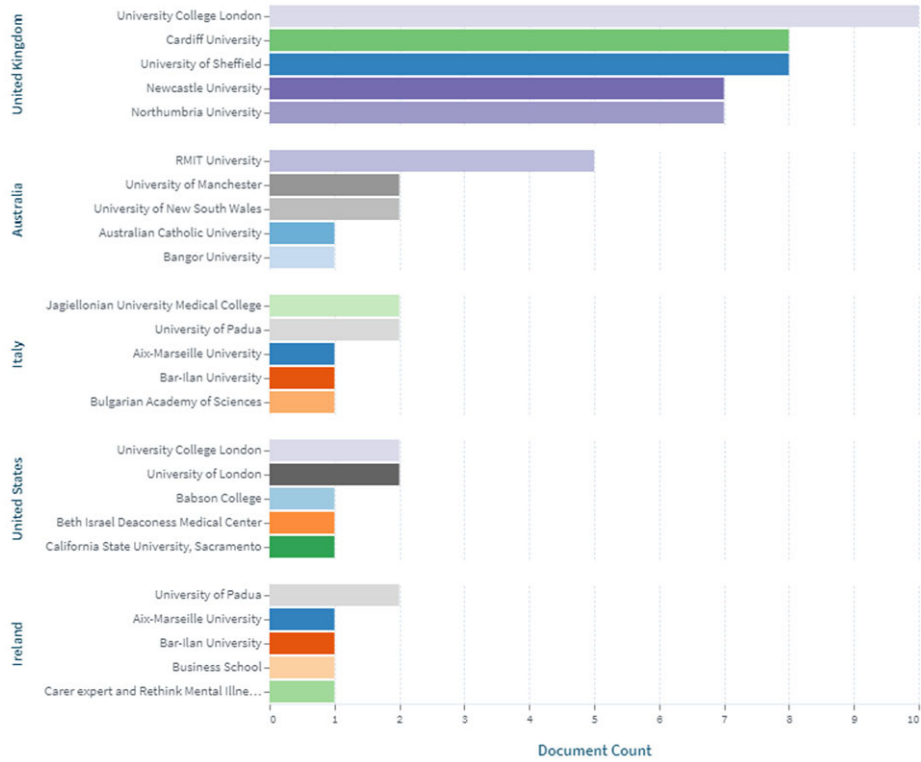


Fig. 5. The most productive institutions by publication count and country/region

Figure 6 indicates the contributed institutions by field of study, including Psychological interventions, Medicine, Psychology, Applied psychology and Business. University College London is a leading institution in Psychological interventions (n=6), Medicine (n=5) and Psychological fields (n=5). University of Sheffield is one of leading institutions in Psychological interventions (n=6), Medicine (n=4), Psychology (4). In Applied psychology the leading are University of Edinburgh, University of Sheffield and University of Strathclyde (n=2 each). In the Business field the leading is the University of Birmingham (n=2).

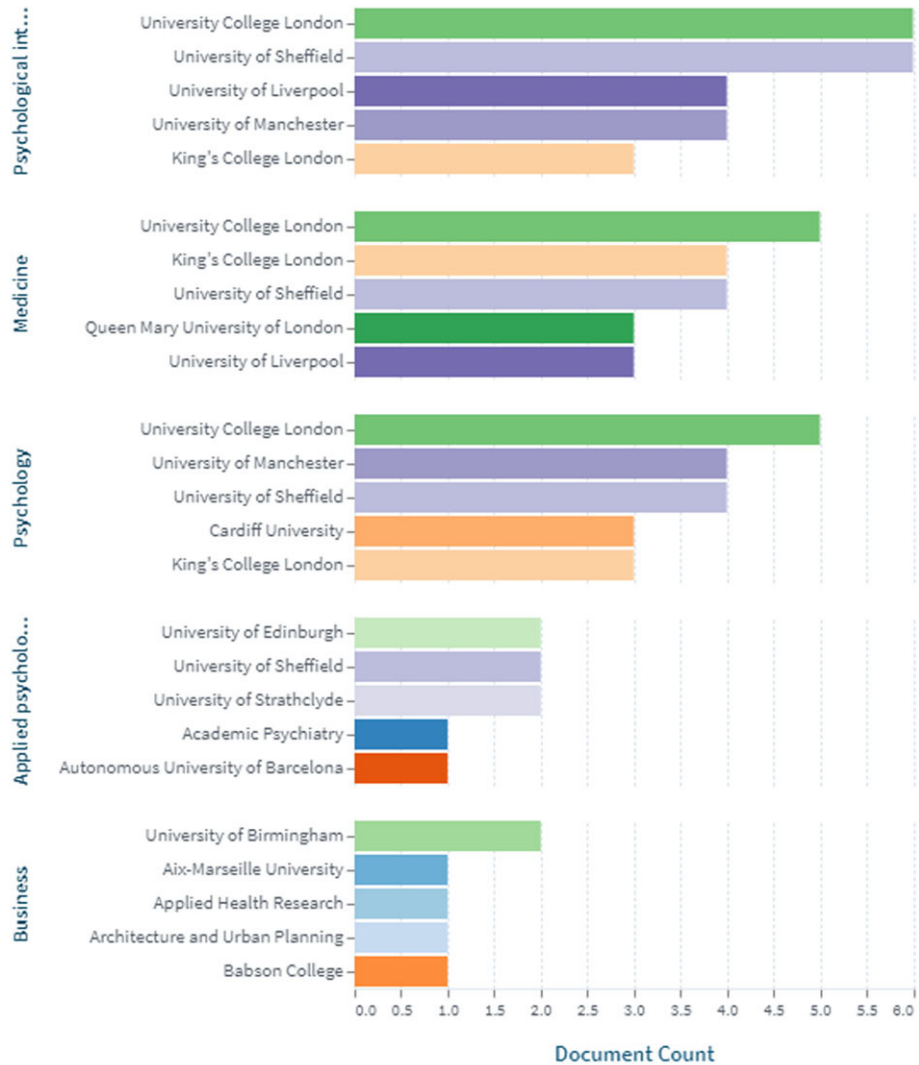


Fig. 6. The field of study and university

Figure 7 shows the most productive (top 20) countries that contributed to the research domain fields. The top three countries are the United Kingdom (93 papers), Australia (14 papers) and USA (10 papers), followed by Ireland and Italy (6 papers each), Germany (5 papers), Netherlands and Norway (4 papers each), Malaysia, South Africa and Zambia (3 papers each) and UAE, Austria, Bangladesh, Belgium, Canada, Switzerland, China, Portugal and Sweden (2 papers each).

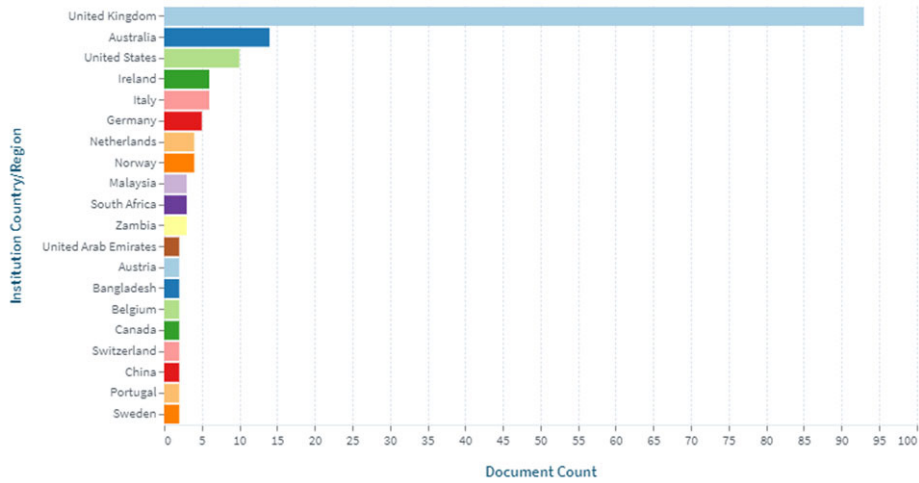


Fig. 7. The countries/regions of the institutions most actively engaged in the result set by their scholarly works

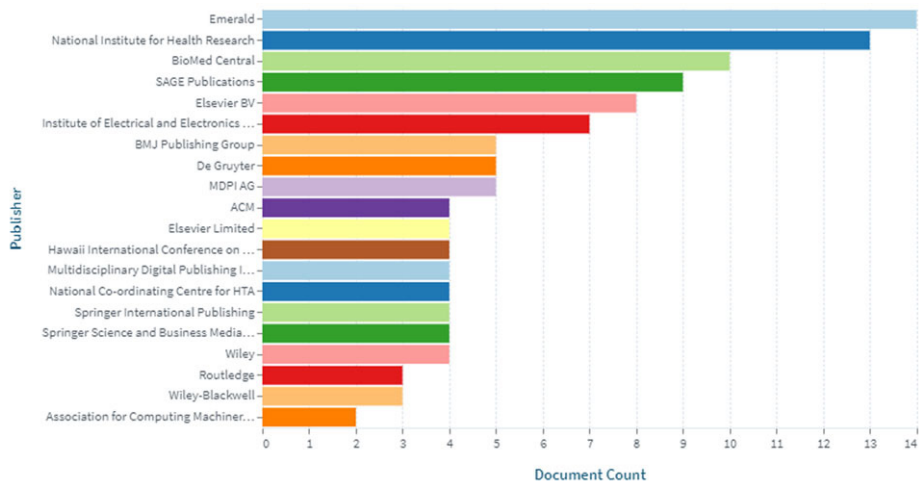


Fig. 8. The top publication sources (titles) categorized by publisher

Figure 8 shows the top publishers by the number of scholarly works in this result set. The top two publishers are Emerald (14 papers), National Institute for Health Research (13 papers) followed by BioMed Central (10 Papers), Sage Publications (9 papers), Elsevier BV (8 papers) and Institute of Electrical and Electronics Engineers (7 papers). Although there is not a large amount of articles published in other publishers, it still seems that they published similar amounts of papers (n=2, n=3, n=4 respectively).

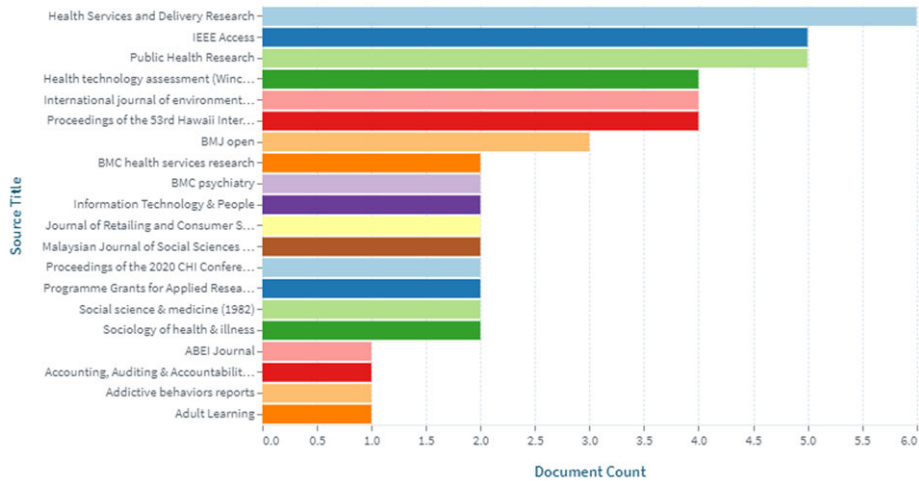


Fig. 9. The top publication sources (titles) categorized by document count

Figure 9 indicates 20 top journals in this result set. The leading journal is Health services and delivery research (n=6), followed by IEEE Access and Public health (n=5 each). Health technology assessment, International journal of environment research and public health, Proceeding of Hawaii Conference (n=4 each). BMJ open published 3 papers, while other sources 2 papers and less.

4.4 Citation results

The Table 1 presents the top ten articles by citation counts.

Simpson et al. (2020) publication is the leading paper and has the highest citation, with 48 counts out of 656 is 7.3% . Paper by Jacob, Sanchez-Vazquez and Ivory was cited 38 times out of the total (5.7%). The other paper in the top ten citations was published by Ogunleye et al. and was cited 33 times, which is 5% of the total citations. Paper by Avenell et al. counted from 32 citations out of 656 which is 4.8% out of the total citations.

There are no leading journals, since every paper is published in different sources. However, the highest citations were received by the *Public Health Journal*, followed by *JMIR mHealth and uHealth*, *Frontiers in pharmacology*, *Health technology assessment*, *IEEE Access*, *Clinical Nutrition*, *International Journal of behavioral nutrition and physical activity*, *Journal of Retailing and Consumer Services*, *Accounting, Auditing & Accountability Journal*. Analyzed papers were published for mental health, COVID-19 pandemic, interventions, and social media.

Table 1. Top ten articles by citation results (2020–2021)

Title	Author	Published	Journal / Source	Citations
An app-, web- and social support-based weight loss intervention for adults with obesity: the HelpMeDolt! feasibility randomised controlled trial	Sharon Anne Simpson, Lynsay Matthews, Juliana Pugmire, Alex McConnachie, Emma McIntosh, Elinor Coulman, Kathryn Hughes, Mark Kelson, Sarah Morgan-Trimmer, Simon Murphy, Olga Utkina-Macaskill, Laurence Moore	2020	Public Health Research, Issue: 3, Volume: 8, Pages: 1–270.	Citing Works: 48 References: 113
Social, Organizational, and Technological Factors Impacting Clinicians' Adoption of Mobile Health Tools: Systematic Literature Review	Christine Jacob, Antonio Sanchez-Vazquez, Chris Ivory	20-Feb-20	JMIR mHealth and uHealth, Issue: 2, Volume: 8.	Citing Works: 38 References: 195
Response to the Novel Corona Virus (COVID-19) Pandemic Across Africa: Successes, Challenges, and Implications for the Future	Olayinka O Ogunleye, Debashis Basu, Debjani Mueller, Jacqueline Sneddon, R Andrew Seaton, Adesola F Yinka-Ogunleye, Joshua Wamboga, Nenad Mijlković, Julius C Mwita, Godfrey Mutashambara Rwegerera, Amos Massele, Okwen Patrick, Loveline Lum Niba, Melaine Nsaikila, Wafaa M Rashed, Mohamed Ali Hussein, Rehab Hegazy, Adefolarin A Amu, Baffour Boaten Boahen-Boaten, Zinhle Matsebula, et al.	11-Sep-20	Frontiers in pharmacology, Volume: 11, Pages: 1205.	Citing Works: 33 References: 276
Bariatric surgery, lifestyle interventions and orlistat for severe obesity: the REBALANCE mixed-methods systematic review and economic evaluation	Alison Avenell, Clare Robertson, Zoë Skea, Elisabeth Jacobsen, Dwayne Boyers, David Cooper, Magaly Aceves-Martins, Lise Retat, Cynthia Fraser, Paul Aveyard, Fiona Stewart, Graeme MacLennan, Laura Webber, Emily Corbould, Benshuai Xu, Abbygail Jaccard, Bonnie Boyle, Eilidh Duncan, Michal Shimonovich, Marijn de Bruin	2020	Health technology assessment (Winchester, England), Issue: 68, Volume: 22, Pages: 1–246.	Citing Works: 32 References: 369
Twitter and Research: A Systematic Literature Review Through Text Mining	Amir Karami, Morgan Lundy, Frank Webb, Yogesh K Dwivedi	2020	IEEE Access, Volume: 8, Pages: 67698–67717.	Citing Works: 26 References: 100

ESPEN guideline on home parenteral nutrition	Loris Pironi, Kurt Boeykens, Federico Bozzetti, Francisca Joly, Stanislaw Klek, Simon Lal, Marek Lichota, Stefan Mühlebach, Andre Van Gossum, Geert Wanten, Carolyn Wheatley, Stephan C Bischoff	18-Apr-20	Clinical nutrition (Edinburgh, Scotland), Issue: 6, Volume: 39, Pages: 1645–1666.	Citing Works: 25 References: 162
Get the message? A scoping review of physical activity messaging	Chloé Williamson, Graham Baker, Nanette Mutrie, Ailsa Niven, Paul Kelly	15-Apr-20	The international journal of behavioral nutrition and physical activity, Issue: 1, Volume: 17, Pages: 51.	Citing Works: 22 References: 154
Sharing of fake news on social media: Application of the honeycomb framework and the third-person effect hypothesis	Shalini Talwar, Amandeep Dhir, Dilraj Singh, Guram Singh Virk, Jari Salo	2020	Journal of Retailing and Consumer Services, Volume: 57, Page: 102197.	Citing Works: 19 References: 57
The COVID-19 office in transition: cost, efficiency and the social responsibility business case	Lee D Parker	21-Jul-20	Accounting, Auditing & Accountability Journal, Issue: 8, Volume: 33, Pages: 1943–1967.	Citing Works: 18 References: 57
Social Media Use and Cyber-Bullying: A Cross-National Analysis of Young People in 42 Countries	Wendy Craig, Meyran Boniel-Nissim, Nathan King, Sophie D Walsh, Maarjke Boer, Peter D Donnelly, Yossi Harel-Fisch, Marta Malinowska-Cieslik, Margarida Gaspar de Matos, Alina Cosma, Regina Van den Eijnden, Alessio Vieno, Frank J Elgar, Michal Molcho, Ylva Bjereld, William Pickett	2020	Journal of Adolescent Health, Issue: 6, Volume: 66, Pages: S100–S108.	Citing Works: 16 References: 40

5 Discussion and conclusion

Technology has a significant impact on the psychological, social, medical and business fields of our life, however just inserting a technological tool to a traditional teaching paradigm does not result in more effective outcomes. The technology utilized as a supportive tool in intervention programs allows it to reach more efficient outcomes. Technology supports professionals and practitioners in improving the well-being, managing mental and physical illnesses, adopting new knowledge and skills or protecting from possible negative impacts.

The objective of this work is to present a bibliometric analysis of all the scientific articles published by the journals which were indexed and ranked in the Web of Science Core Collection and Scopus, during the period of 2020 to 2021 and available in Crossref, Microsoft Academic, PubMed, PubMed Central, Core databases. The structure of this study allowed me to explore and identify the main research domains of “Psychological Social Medical Business Interventions” in relation with “Interactive Mobile Technologies” concerning “mental and physical health”. Therefore, research questions have been formed to understand and find out the outputs in publication patterns according to the database results.

According to the obtained results, in total 174 studies have been published during the period of 2020–2021 years, showing high interest in the analyzed subject. The bibliometric research outcome would clearly state that the number of articles published in the research topic has increased during the period of June and July 2020 and sharply decreased in September 2020. Psychology, Psychological interventions, Medicine, and Sociology are considered as the most interesting fields in exploring technology usage in professional education fields. The United Kingdom is a leading country in discovering the relationship between technology usage and interventions in the health system (40 papers out of 174). The Emerald, National Institute for Health Research, BioMed Central and Sage Publications are the top four publishers supporting the domain of technology usage in various domains.

Concerning the limitations of this study, our bibliometric search strategy was broad so that the further analysis might be focused on the cross-sectional association between various variables including professional education, personality, and social impact. With regard to the limitations of this study, the bibliometric search strategy was broad, however, further analysis will follow in a more deep complex manner such as content analysis, co-word, citation, co-citation, and network analysis. In addition, conducting analysis within a longer period of time might be a significant factor influencing the result. Our study indicates the importance of conducting more studies exploring the feasibility of using technology to improve the subjective and psychological well-being. In this study, it has been taken as an essential step in examining the scientific publication patterns for the technology usage for psychological, social, medical and business interventions for mental and physical health between 2020 and 2021. Presented results attempted to analyze and synthesize available studies in the mentioned field to establish a holistic understanding of interrelations between indicated constructs.

An analysis of trends and patterns of existing publications within chosen domains will allow researchers and practitioners to be aware of the most actual existing need in gaining and applying data in practice. The results obtained in our study also emphasize

the need for more studies on the efficiency of using technology as a supportive tool, as well as increase awareness of these interventions among them. This article is relevant for practitioners and researchers working in different fields, as well as for those who work and contribute to the field of information studies, business, psychology and interdisciplinary studies.

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